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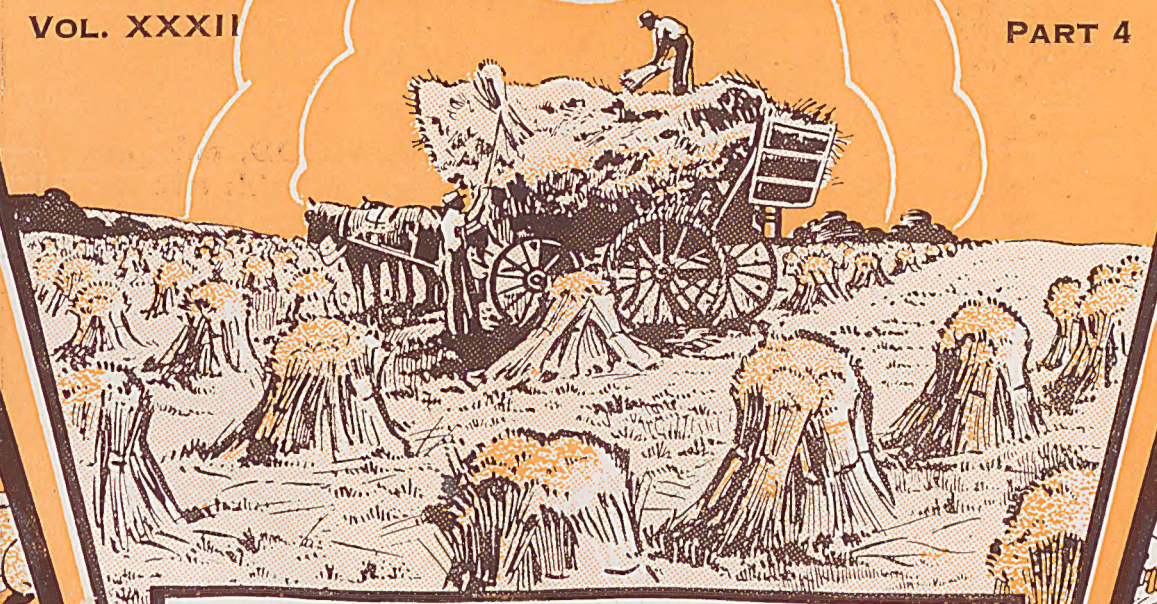
VOL. XXXII PART 4



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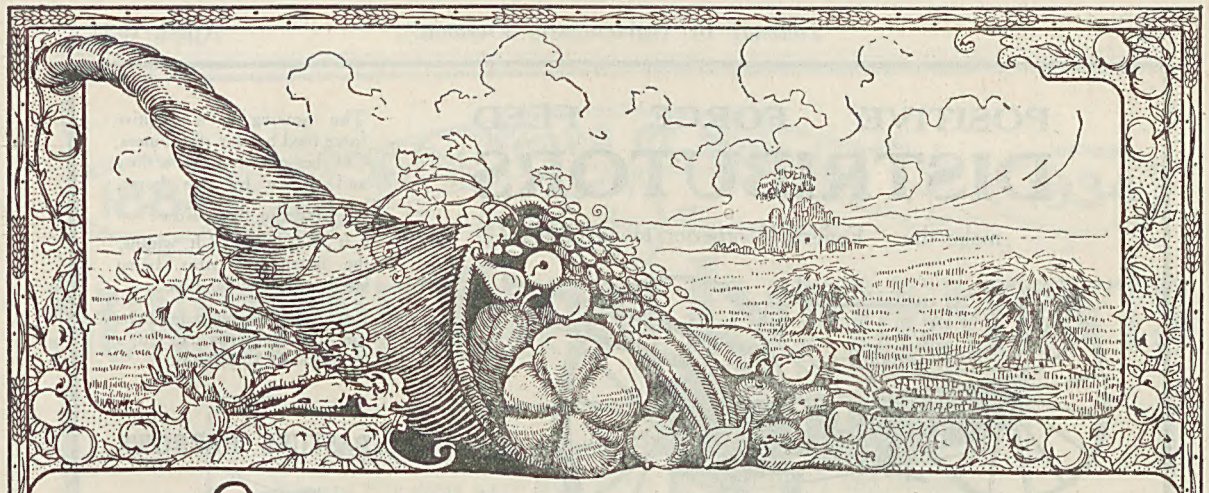

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Issued under the direction of the Hon. J. Allan, M.L.A., Minister of Agriculture.

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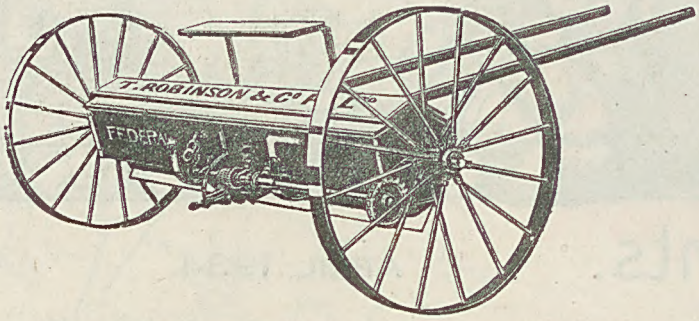

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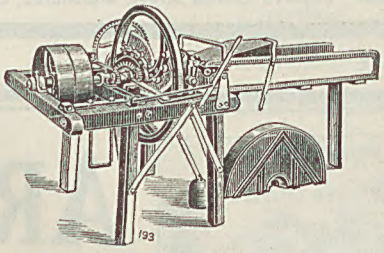

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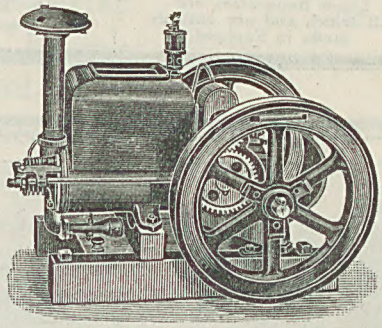

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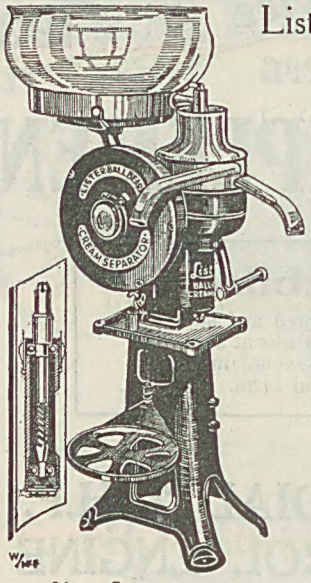

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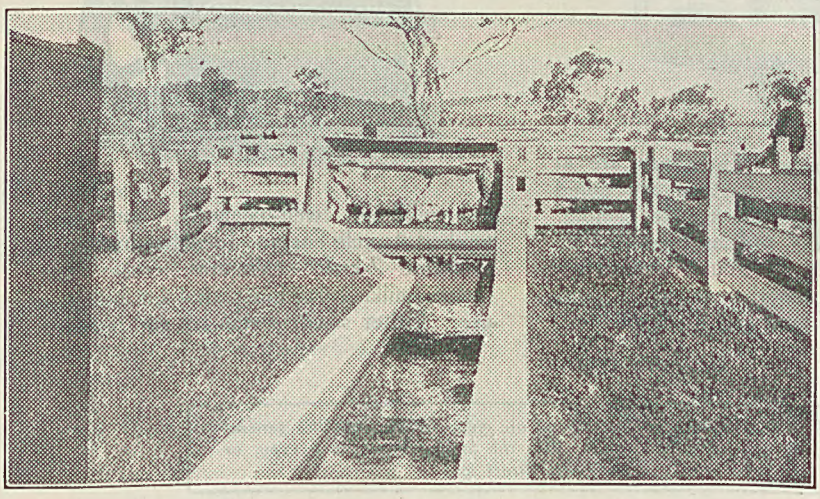

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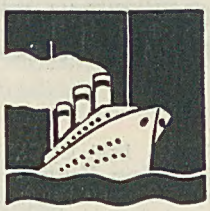

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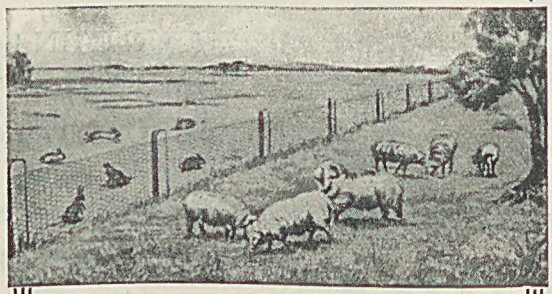

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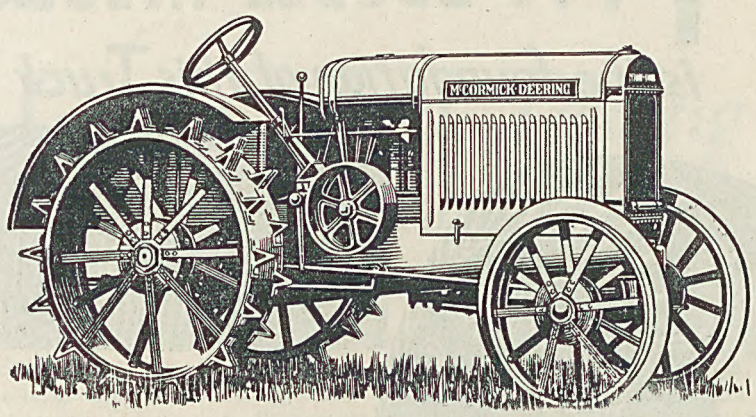

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Like the Farmall 12, the Standard Farmall is an ideal tractor for all kinds of work and is particularly suitable for use in row crops. It is just the tractor for orchard or vineyard work or for use wherever turning space is limited.

McCormick-Deering 22-36 Tractor

The McCormick-Deering 22-36 tractor is powered by a sturdy, economical engine and, like all McCormick-Deering tractors, it develops power from three points. If it is power you need on your farm—dependable power delivered at low cost—this is the tractor that will measure up to your most exacting needs.

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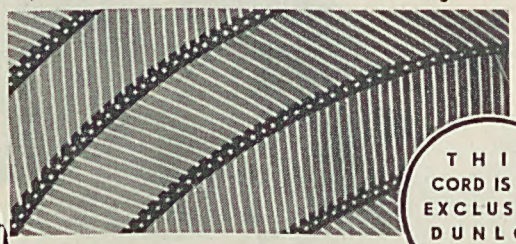

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The Journal of the Department of Agriculture of Victoria

Grade Herd Testing

Annual Report, 1933

By W. J. Yuill, Senior Dairy Supervisor

THE remarkable progress of the Grade Herd Testing movement in Victoria from its somewhat obscure beginning in 1921 is shown in the accompanying Graph I. The first two units were organized thirteen years ago, and in 1921 some 1,600 cows were tested, as compared with 104,000 cows in 1933, when 3,383 herds were under test. This represented an increase of 14,290 cows over the previous year, when the movement received a slight setback owing to financial difficulties in some of the weaker units.

Instead of decreasing interest in the test, the serious decline in the price of butter-fat, and the increasing intensity of the depression, appear to have driven more dairy-farmers to consider herd-testing as a potential factor in the more economic production of butter-fat. This experience has not been confined to Victoria, and in New Zealand 26,197 more cows were tested in 1933 than in the preceding year.

Although the increased activity of 1933 is not being maintained during the current year, it can be said that dairy-farmers are realizing that in dairy-farming, as in any other form of enterprise, only the fittest may be expected to survive a crisis, and that to maintain a proper control of their herds they must continue to test.

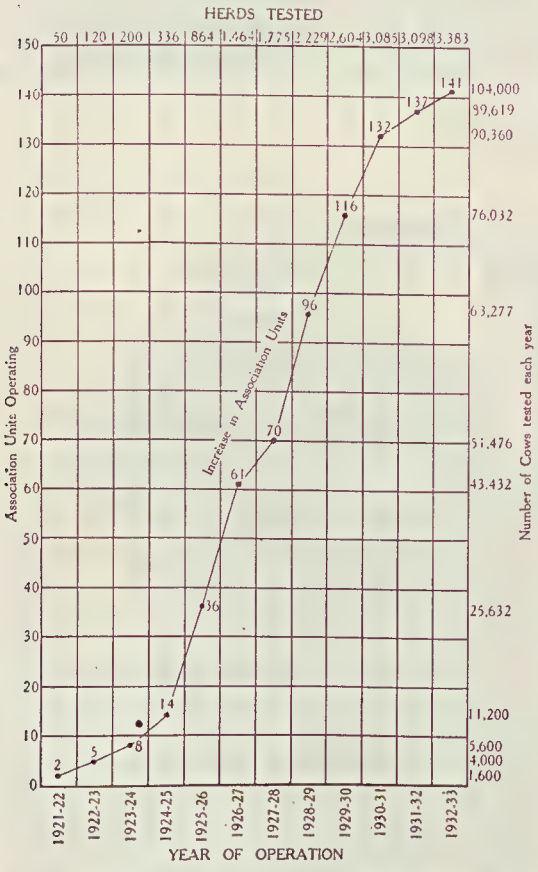
At the present time the industry is passing through a period of extreme difficulties, and many problems have to be faced, the most important, of course, being those of increasing the quality of the products and decreasing the costs of production.

In practically every dairying area there are farms on which a high degree of efficiency in dairy-farm practice is maintained, and on such farms all that can be done during the "marking time" period until better days return, is to concentrate on any weakness that may occur. On the majority of farms, however, a great deal remains to be done.

A survey of the annual reports of the herd test indicates that more attention might be given to out-of-season calving. It is not overlooked that metropolitan milk supply farms require frequent additions to the milking herd throughout the year—generally, however, it is not good farm practice to have cows calving at any time. While, in irrigation and high summer rainfall areas, more liberty may be taken with late spring-calvers, it is definitely known from extensive investigations that "late-in" cows do not do themselves justice at the pail.

There is a period of non-growth of pastures in practically every portion of the State. In northern Victoria this is generally due to

excessive dryness, while in the southern parts of the State during winter excessive coldness (as in South Gippsland) prevents growth to any appreciable extent. Every effort should be made to milk the herd through the longest period of normal paddock growth, which usually is from late autumn to early summer.



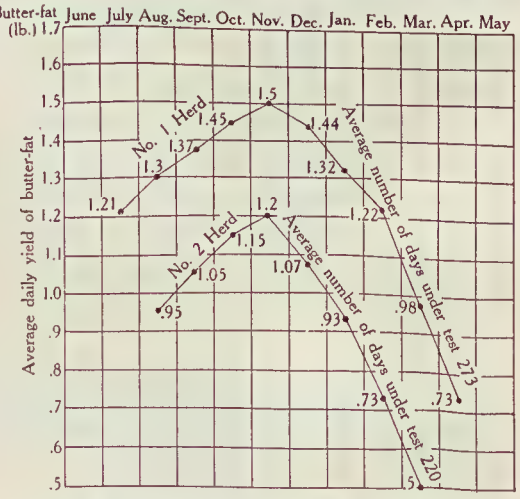
Graph I.—Showing the expansion of the grade herd testing movement in Victoria during the past 12 years.

However, the outstanding weakness of dairy-farm practice still lies in the feeding and management of the herd. This fact is clearly indicated by the average number of days in milk of herds that enjoy similar conditions of climate, soil, and locality—it being not unusual to find a difference of as much as 100 lb. of butter-fat or more per cow in the average returns for the year.

Some of the difference observed may be due to a constitutional incapacity to produce; evidence is not wanting, however, which suggests that insufficient and unsuitable feeding is a far greater factor than lack of inherent ability.

In those years, when there are good autumn rains, it is surprising how these otherwise short-season herds keep on milking. The extended period of succulent green growth, with its higher proportions of protein, mineral, and vitamines, than are present in even a super-abundance of dry fodder, supplies the needed elements of a sustained milk flow. The efficient dairy-farmer sees to it that his herd of milkers will enjoy these conditions each year for as long a period as is possible.

An example of insufficient feeding is illustrated in Graph II., in which are shown the monthly yields of two herds milked under similar conditions of soil and rainfall. No. 1 herd gave an average yield of 340 lb. butter-fat, and earned £11 6s. per head with butter-fat at 8d. per lb. The second herd averaged only 180 lb. butter-fat, and earned only £6 per head. There were only 53 days difference in the average milking period of each herd, but for eight months of the year the No. 1 herd was producing at a higher rate than was No. 2 herd in its peak month. The former herd might be compared with the summer sun, which rises early, climbs higher in the skies, and sets late in the day. No. 2 herd, on the other hand, is like the winter sun, which rises late, climbs to no great height, and sets early. No. 1 herd is compulsorily dried



Graph II.—Showing variation in production in two herds under similar conditions of soil and climate.

down in the tenth month of lactation, while still averaging more than ¾ lb. butter-fat daily; while the second herd is rapidly drying off in the eighth month, and is producing less than ½ lb. daily.

No. 1 herd was well fed the whole year round, and could, therefore, exhibit its real form at the pail. No. 2 herd, which was in lower condition, freshened a month later and, as the "spring flush" of feed occurred, improved in condition and yield, reaching the peak of production in the same month as No. 1 herd. There was no continuity of green feeding, however, and a steep decline in production occurred from November to March, and in eight months the herd was practically dry.

Dairymen will long remember the splendid autumn pastures of 1932, but the lesson that it provided in feeding dairy cows has already been largely forgotten.

Herds are culled in order to secure a higher herd average, but there are cases in which the efficiency of the farm might be increased and greater economy obtained on a lower herd average. The carrying capacity of the farm and the total output of butter-fat for the year are essential features that must be considered in any scheme of dairy-farm economies, for they are of more importance than the actual average production of the herd.

This fact may be illustrated as follows:—Farm A and farm B were purchased at similar values; there is, however, a marked difference in the carrying capacity of the two farms, and in the herd averages, with the result that "farmer A" has 1,000 lb. less butter-fat to sell, although the average of his head is 25 per cent. higher than that on farm B. Apparently in his case the acres are too many or the cows too few.

Farmer A, however, may be able to increase his herd numbers without appreciably decreasing the herd average. Under such conditions, high herd average can be appreciated.

—	Capital Value.	Cows Milked.	Butter-fat Average.	Total Butter-fat for Year.
	£			
Farm A ..	2,000	20	400	8,000
Farm B ..	2,000	30	300	9,000

Mr. P. Gannon's three-year-old "Ponsie," which yielded 670 lb. of butter-fat and has since given 427 lb. in the first 157 days of the current lactation.

Interesting examples of herds in which there has been a steady increase in yield, as well as an increase in numbers, are provided by the cases of Messrs. J. Trease and Hamilton Brothers, foundation members of the North

Sixteen members of the herd of the late Jas. Clync, of Maffra, which each yielded more than 500 lb. of butter-fat. The group includes three cows that gave more than 600 lb.—one of these yielding more than 700 lb. butter-fat.

Dumbalk Association. The records below show the number of cows and average yields of their herds for the first two and last two years of a ten-year period.

—	1922.		1923.		1931.		1932.	
	Cows.	Butter-fat.	Cows.	Butter-fat.	Cows.	Butter-fat.	Cows.	Butter-fat.
J. Trease	31	251	35	266	56	372	52	363
Hamilton Bros. ..	41	217	45	222	57	310	60	326

In the Dumbalk area, there are two associations, whose records over the past ten years are available. The increased production of each unit is interesting, and shows that progressive development can be maintained, despite many factors that tend to bring depreciation in the herds of members:—

Dumbalk North Association.

Year.	Cows Tested.	Average Yield of Butter-fat.
		lb.
1922–3 ..	827	167
1923–4 ..	702	190
1924–5 ..	750	192
1925–6 ..	812	195
1926–7 ..	906	209
1927–8 ..	827	238
1928–9 ..	792	257
1929–30 ..	966	245
1930–31 ..	894	286
1931–32 ..	924	285
1932–33 ..	1,008	292

Average increase per cow, since the beginning of the Association, 115 lb. Butter-fat.

Dumbalk Association.

Year.	Cows Tested.	Average Yield of Butter-fat.
		lb.
1922–3 ..	759	150
1923–4 ..	706	180
1924–5 ..	737	213
1925–6 ..	761	168
1926–7 ..	664	192
1927–8 ..	682	227
1928–9 ..	592	253
1929–30 ..	673	232
1930–31 ..	691	265
1931–32 ..	621	263
1932–33 ..	727	266

Average increase per cow, since the beginning of the Association, 116 lb. Butter-fat.

Herd-testing in itself cannot increase yields. What it does do is to disclose weaknesses of breeding and feeding methods. The records reveal, but they do not rectify. Instances are known of men who entered their cows for testing, and withdrew them because the herd did not improve under test!

"Bonnie Maid" a splendid type of grade cow in the herd of the late Jas. Clyne, Maffra.

There are many factors that may influence the production of a cow in any lactation, and no details of these are supplied by the record card, and a farmer can make a rational comparison between the records of his tested cows and those of any other herd, only after all reasons for variability have been considered. For instance, junior cow records should not be compared with those made by mature cows until age correction factors have been used, while a record made by a cow that is not in calf should not be compared with one of a cow that has carried a calf for the major portion of the lactation. Again, records made by cows freshening in low condition, and remaining so throughout the lactation, should not be compared with those of cows prepared for the test and maintained in good condition.

The history of grade herd-testing in Victoria is summarized briefly below:—

1921—First two units organized. Fifty members testing.

1923—First conference of herd-testing farmers. The Gippsland United Cow Test Association formed.

1924—A uniform set of rules drawn up.

1925—Subsidy granted by the Government. This help and the activities of the Better Farming Train greatly stimulated the work.

The Gippsland central organization was merged into a State-wide one, at a conference, September, 1925, and The Victorian United Cow Test Association was formed.

1928—Constitution of the V.U.C.T.A. drawn up. A council of ten representatives provided for from defined areas. This has since been the controlling body throughout Victoria. Arrangements completed for herd-testing work to be carried out by certificated testers. Production certificates of merit issued by the Royal Agricultural Society to all owners of herds over 300 lb. butter-fat. Branding scheme for the identification of herd-test cows introduced.

1929—Calf marking scheme launched. Under this scheme grade female calves are registered on a production basis. The dam must have given, under test, certain prescribed minimum yields of butter-fat. The sire must be a registered pure-bred animal, whose nearest female relations must also be known producers.

1930—A State-wide dairy-farm competition was designed. A special feature of the scheme was a competition in each of the ten zones, and at the same time an inter-zone competition for the C.F.C. championship shield.

1931—Arising out of the dairy-farm competition, came the extensive development of field days as a means of education. In this work the

"Jumbo" an 18-year-old grade from the herd of the late J. Clyne. Despite her lack of dairy type, this cow has a seven years' average of 492 lb. butter-fat.

important features of the winning farms are used by experts for demonstration work. A conservative estimate of the number of farmers reached in this manner is set down at 15,000. Upwards of 150 farms have been visited in all parts of the State.

The enthusiasm which marked the interest in field-day work led the central council to employ it as a means of personal contact between members of widely-distant units affiliated with the V.U.C.T.A. This is done by staging an annual field day during Royal Show week, when large numbers of delegates are in Melbourne to attend the annual conference of the Herd Test Association. Unusual

Three generations of high producing grade cows from the herd of the late J. Clyne. Left.—"Grace," six years' average, 474 lb.; Centre.—"Grace II.," four years' average, 520 lb.; Right.—"Graceful," 565 lb. butter-fat as a senior two-year-old, and 650 lb (on three quarters) as a three-year-old.

success has attended their efforts in this respect. At the field day held in 1933 at Dumbalk, in South Gippsland, some 500 persons attended.

It is impossible to calculate the great good that has accrued from this work. Lectures, demonstrations, and advice on every phase of dairy-farm activity are given by experts and leading farmers. Breeding and feeding farm stock, construction of dairy-farm buildings, care of cream, sanitation, herd-testing problems, feeding calves, dairy-farm economies, bull indexing, balancing rations, and making ensilage and hay are the subjects usually dealt with, while pasture work from the seed-bed and seed mixture to methods of controlled grazing, harrowing, cultivation, and fertilizing also receive attention.

Group of Red Polls on the farm of Mr. A. Evans, Lima East. Each of these cows yielded more than 500 lb. butter-fat.

TABLE I.—HIGH-PRODUCING HERDS OF LESS THAN 20 COWS RANGED ACCORDING TO PRODUCTION.

Owner.	Association.	Number of Cows.	Average Yield of Butter-fat.
			lb.
L. Hutchins ..	Rochester ..	10	465
Bland and Roberts	Yarram ..	15	440
J. Price ..	Rochester ..	18	438
Mrs. H. Soutar ..	Rochester ..	13	423
W. Waterhouse ..	Pakenham ..	17	421
D. Nicol ..	Traralgon ..	15	420
O. Thaw ..	Stanhope ..	18	420
G. Beasley ..	Swan Hill ..	16	416
E. Watson ..	Rochester ..	16	413
H. McRae ..	Rochester ..	15	412
Mrs. F. Price ..	Swanpool ..	10	410
H. Head ..	Seymour ..	12	409
H. Prime ..	Winchelsea ..	19	408
C. McLeod ..	Bunyip ..	12	404
T. Sullivan ..	Kyneton ..	10	400
F. Williams ..	Rochester ..	26	382
L. Collins ..	Dreeite ..	19	381
A. G. Fox ..	Yinnar ..	18	380
J. Seirs ..	North Murchison	16	379
W. Reid ..	Winchelsea ..	19	375
J. Stillman ..	Stanhope ..	16	373
Mrs. Miller ..	Narracan ..	19	372
G. Harrison ..	Stanhope ..	17	370

TABLE II.—HIGH-PRODUCING HERDS OF FROM 20 TO 40 COWS RANGED ACCORDING TO PRODUCTION.

Owner.	Association.	Number of Cows.	Average Yield of Butter-fat.
			lb.
J. Bullingham ..	Tongala ..	22	423
J. Bennett ..	Yinnar ..	26	421
R. Rautmann ..	Maffra ..	21	418
J. Story ..	North Murchison	22	412
A. Freestone ..	North Murchison	21	400
G. Petersen ..	Newstead ..	25	399
J. Ryan ..	Warragul ..	24	399
Mrs. W. Campbell	Tongala ..	20	398
G. Fraser ..	Gainsborough ..	28	397
H. Loader ..	Rochester ..	35	392
T. McClusky ..	Tongala ..	25	391
J. R. Flegg ..	Kerang ..	20	390
G. McColl ..	Bunyip ..	24	389
T. White ..	Swanpool ..	24	389
G. Stanlake ..	Loch	20	386
F. Swarbrick ..	Salo	20	385
T. M. Noble ..	Maffra ..	28	384
G. Duck ..	Tongala ..	36	384
D. McKenzie ..	Fish Creek ..	26	382
F. Mills ..	Warragul ..	23	380
J. Sillers ..	Narracan ..	23	374
J. Whiston ..	Bunyip ..	21	374
T. Collins ..	Yinnar ..	24	373
W. Cannon ..	Condah ..	22	372
A. G. Brown ..	Coleraine ..	28	372
A. Bleckley ..	Warragul ..	26	370

(1) Mr. G. Beasley's "Cocky," which, for six years has averaged 543 lb. butter-fat, with two records of more than 600 lb.; (2) Mr. F. E. Johnson's "Jannie"—yield as a four-year-old, 527 lb. butter-fat; (3) Mr. G. J. Howell's "Poppy," 522 lb.; (4) Mr. G. Beasley's "Ladybird," five years' average, 455 lb.; (5) Mr. Beasley's "Ladyship," six years' average, 473 lb.; (6) Portion of Mr. Beasley's herd at Swan Hill; (7) Grazing on rape, section of Mr. W. Hannah's herd at Winchelsea.

TABLE III.—HIGH-PRODUCING HERDS OF FROM 40 TO 60 COWS RANGED ACCORDING TO PRODUCTION.

Owner.	Association.	Number of Cows.	Average Yield of Butter-fat.
			lb.
B. Dowsen ..	Wonthaggi ..	45	391
D. Brown ..	Myrtleford ..	47	386
J. G. Howell ..	Leongatha ..	41	381
T. Glover ..	Lock	43	381
Ken. Gunn ..	Leongatha ..	40	379
J. Trease ..	Dumbalk ..	53	363
H. J. Rix ..	Pakenham ..	60	361
H. Furphy ..	Dumbalk ..	50	361
D. Jarvie ..	Rochester ..	40	353
H. E. Keele ..	Rochester ..	47	351
E. Harney ..	Warrnambool ..	53	350
T. Cordwell ..	Eskdale ..	59	349
D. Nicols ..	Tallangatta ..	45	336
P. Nicols ..	Tallangatta ..	48	331
Clyne Bros. ..	Maffra ..	50	331

A group of high producing grade Ayrshires on the farm of Mr. W. Smethurst, Mountain View Association.

TABLE IV.—HIGH-PRODUCING HERDS OF FROM 60 TO 80 COWS RANGED ACCORDING TO PRODUCTION.

Owner.	Association.	Number of Cows.	Average Yield of Butter-fat.
			lb.
Jas. Clyne ..	Maffra ..	67	372
Batten and Sons ..	Warrnambool ..	80	358
Foster Bros. (No. 2)	Maffra ..	61	349
Clyne Bros. (No. 1)	Maffra ..	65	337
Kinsella Bros. ..	Lang Lang ..	70	331
C. P. Tobin ..	Eskdale ..	68	326
Foster Bros.(No. 3)	Maffra ..	63	323
R. Buchannan ..	Tallangatta ..	65	315
E. M. Bowman ..	Tallangatta ..	62	314
L. Semmens ..	Maffra ..	68	312
A. Halcomson ..	Irrewarra ..	64	304
Clyne Bros. ..	Maffra ..	75	300

TABLE V.—HIGH-PRODUCING HERDS OF MORE THAN 80 COWS RANGED ACCORDING TO PRODUCTION.

Owner.	Association.	Number of Cows.	Average Yield of Butter-fat.
			lb.
Moore and Co. (No. 1)	Yarram ..	103	332
Wm. Gunn ..	Leongatha ..	198	324
P. Hickey ..	Cobden ..	85	318
Mrs. A. Nixon ..	Orbost ..	122	296
H. Addensall ..	Macarthur ..	97	289
Moore and Co. (No. 4)	Yarram ..	93	282
Clyne Bros. (No. 3)	Maffra ..	95	282
Moore and Co. (No. 3)	Yarram ..	121	272
Pardew Bros. ..	Orbost ..	97	262
Clark Bros. ..	Warrnambool ..	121	245
J. E. Mann ..	Penshurst ..	107	240
A. Cameron ..	Orbost ..	125	230

The Year's Activities.

In considering the report of the 1932-3 season, one must not overlook the unusual weather conditions. The very early rains induced a wonderful "flush" of pasture growth through the summer and autumn; abundance of winter feed followed, and the spring was mild. In such circumstances the autumn-calving cows, which finished their lactation in the year under review, and—of which there is a relatively high proportion in parts of the western and northern areas—showed remarkable increases in their production. This result was reflected in the increase of 16.2 lb. of butter-fat per cow in the western area. The eastern half of the State, on the other hand, may be considered largely as a spring-calving area, since most of the cows there calve between late winter and spring. These cows calved in splendid form, following a mild winter. They enjoyed good spring conditions, but experienced unusually dry weather from late spring on to the end of the season. The dry condition also reduced the yield of the herds in the North-East and Gippsland areas.

Results for the year are summarized in Table VI., which shows that, despite the increase in the number of cows tested from 89,619 in 1931-32 to 104,009 in 1932-33, the high average yields previously recorded were well maintained, the slight reduction of 6.2 lb.

butter-fat per cow undoubtedly being attributable to the less favorable seasonal conditions and the inclusion of the 14,290 new cows in the test.

This table shows also that there has been a steady increase in the proportions of junior cows and pure-bred bulls. The higher percentage of junior cows is an indication that dairy-farmers whose herds are under test are using a larger number of selected home-bred heifers than formerly. The increase in five years of 13 per cent. in the proportion of pure-bred bulls in use must be regarded as gratifying. The average herd size, which had remained stationary for three years, shows a slight increase.

Portion of the herd of Mr. J. G. Howell, of Leongatha. The 41 cows in this herd averaged 381 lb. butter-fat.

The distribution of the 46,392 junior cows tested and their production are set out in Table X. This shows that no fewer than 570 of the juniors yielded better than 400 lb. butter-fat, and that 30 of these gave more than 500 lb.

The Goulburn Valley and northern irrigation areas are again to the fore with the highest percentages in both the three-year-old and the two-year-old sections. The figures of the western area are of unusual interest also when compared with those of 1930-1. In the latter year, only 2.7 of the three-year-olds and 1.8 per cent. of the two-year-olds exceeded 300 lb. of butter-fat, as compared with 4.5 per cent., and 7 per cent. respectively for 1933.

Table VII., in which the work of the 141 units is summarized, shows that 54 units, each of which represents approximately 740 cows, had a milk yield average of more than 550 gallons, 19 of them being over 600 gallons. The average yield of 21 units exceeded 280 lb. of butter-fat per cow.

An analysis of these figures indicates that Gippsland and the north-eastern area suffered severely from the drought conditions of the 1932 summer and autumn, and much ground has been lost. On the other hand, despite the addition of five new units, the Goulburn Valley area has improved its position, while the

TABLE VI.—SUMMARY OF HERD ASSOCIATION DATA FOR THE YEAR ENDED 30TH JUNE, 1933, AND COMPARATIVE FIGURES FOR PREVIOUS YEARS.

Area.	Units.	Herds.	Tested Cows.	Cows under Four Years.		Pure-bred Bulls in use.		Average Number of Cows per Herd.	Average Production per Cow.		
				Number.	Per-centage.	Number.	Per-centage.		Lb. Milk.	Test.	Lb. Butter-fat.
Gippsland ..	56	1,369	41,339	18,138	43·8	1,037	75·7	30	5,277	4·6	247·8
Western District ..	40	903	30,999	12,624	40·7	721	79·8	34	5,316	4·3	233·6
North East ..	21	485	15,926	7,079	44·4	360	74·2	33	5,108	4·4	225·2
Goulburn Valley ..	24	626	15,745	8,551	54·3	501	79·6	25	5,786	4·4	254·8
Total ..	141	3,383	104,009	46,392	44·6	2,619	77·0	31	5,290	4·55	241·1
DATA OF PREVIOUS YEARS.											
1931–32 ..	130	3,098	89,619	36,946	41·3	2,323	75·6	29	5,393	4·58	247·3
1930–31 ..	132	3,085	90,360	32,867	36·4	2,251	73·0	29	5,383	4·30	234·0
1929–30 ..	116	2,604	76,032	24,439	32·1	1,653	71·0	29	4,944	4·59	226·1
1928–29 ..	96	2,229	63,277	19,246	30·4	1,354	64·0	30	5,080	4·38	223·3

western area, with a similar increase in units, has lost but little ground in the comparison.

Despite adverse seasonal conditions, and an increase of nine units, there has been a small percentage increase in units over 600 gallons, and in the units producing over 280 lb. of butter-fat.

Rochester No. 1 and Maffra No. 1 each exceeded the 300 lb. level. The former unit has been close to this mark for several years. The achievement of the Maffra No. 1 unit is a particularly good one, as the 1,100 cows and heifers there averaged 307 lb. of butter-fat. This unit has previously exceeded the 300 lb. mark on several occasions.

Another view of the herd of Mr. Howell. In this herd 23 daughters of the one bull averaged 345 lb. butter-fat on their first lactations.

A splendid yield was recorded by the 1,018 cows and heifers at Dumbalk North, their average of 292 lb. being 115 lb. higher than that of their first year of test. The average of Pakenham, a much younger association, with 616 cows, was only 1 lb. less than that of Dumbalk North. North Murchison also has recorded an increase of 100 lb. butter-fat per cow over the figures of the first year of test—604 cows (50 per cent. of them under four years old) averaging 296 lb. butter-fat. They were closely followed by another Goulburn Valley unit in Tongala No. 1, with 292 lb. butter-fat for 677 cows. In this unit there are several fine herds, and for many years its average has been close to the 300 lb. mark.

In the Western District, Derrinallum and Dreeite show improved returns, while the Warrnambool unit, with 1,077 cows, has the fine average of 274 lb. butter-fat. Tallangatta No. 1 is again head of the North-East area with 936 cows—half of them heifers—on the 265 lb. butter-fat mark.

TABLE VII.—HERD TESTING UNITS GROUPED ACCORDING TO AREA, MILK YIELD, AND PRODUCTION OF BUTTER-FAT, 1932–3.

Area.	Units.	Units Grouped according to Milk Yield.				Units Grouped according to Production of Butter-fat.					
		Over 600 galls.	550 to 600 galls.	500 to 550 galls.	Under 500 galls.	Over 300 lb.	280 to 300 lb.	270 to 280 lb.	250 to 270 lb.	200 to 250 lb.	Under 200 lb.
Gippsland ..	56	3	12	25	16	1	8	10	21	15	1
Western ..	40	3	18	6	13	..	1	3	8	24	4
Goulburn Valley	24	13	4	5	2	1	10	2	2	9	..
North East ..	21	..	1	7	13	..	..	..	4	14	3
Total ..	141	19	35	43	44	2	19	15	35	62	8
1930–31 ..	132	15	42	54	21	6	8	13	31	69	5

PERCENTAGE COMPARATIVE ANALYSIS OF AREAS ACCORDING TO MILK AND BUTTER-FAT YIELD FOR THE YEAR 1932–33, AND WITH THE TOTAL RESULTS OF TWO PREVIOUS YEARS.

Gippsland had 28·5 per cent of units under 500 gallons, and 28·5 per cent of units under 250 lb. of butter-fat per cow, compared with 10 per cent. and 38 per cent. in 1930–31.

Western area had 32·5 per cent. of units under 500 gallons, and 70 per cent of units under 250 lb. of butter-fat, compared with 30 per cent. and 67 per cent. in 1930–31.

The Goulburn Valley area had 8 per cent. under 500 gallons, and 38 per cent. of units under 250 lb. of butter-fat, compared with 6 per cent. and 42 per cent. in 1930–31.

The North-Eastern area had 62 per cent. of units under 500 gallons, and 81 per cent. of units under 250 lb. of butter-fat per cow, compared with 15 per cent. and 55 per cent. in 1930–31.

TABLE VIII. — TESTED HERDS GROUPED ACCORDING TO AREA AND PRODUCTION OF BUTTER-FAT, 1932-3.

Area.	Herds in Area.	Lb. of Butter-fat Range.						
		Over 400 lb.	350 to 400 lb.	300 to 350 lb.	250 to 300 lb.	200 to 250 lb.	150 to 200 lb.	Under 150 lb.
Gippsland	1,369	26	71	204	427	445	174	22
Western	903	2	20	99	283	331	141	27
Goulburn Valley ..	626	23	53	124	188	186	44	8
North East ..	485	3	10	49	95	179	120	30
Total ..	3,383	53	154	476	993	1,141	479	87
PREVIOUS YEARS' SUMMARIES.								
1930-31	3,085	42	127	433	870	1,112	461	40
1928-29	2,292	9	46	181	396	789	559	139

NOTE.—The above table shows that there has been an increase of 48 per cent. in the number of tested herds during the past four years. Of the 3,383 herds under test, only 2·6 per cent failed to produce 150 lb. of butter-fat. No fewer than 683 herds produced better than 300 lb.; i.e., 20·2 per cent. of the total number, and 10 per cent. more than in 1928-29.

Mr. L. Hutchins' herd of ten at Rochester filled the leading place for the year with 468 lb. butter-fat. Five of the cows yielded over 500 lb. Mr. J. Bullingham's grade Freisian herd at Tongala topped the milk yield section with 11,584 lb. and 423 lb. butter-fat. Originally his herd average was 252 lb. butter-fat. The yield of a three-year-old heifer and three mature cows exceeded 500 lb. The breeding worth of "Burnbank Muller 3rd Patch," on the herd, and the splendid pastures and lucerne that have been developed under the capable management of the present owner, have wrought the change.

Some of Mr. J. Bullingham's grade Friesians.

At Yinnar, Mr. J. Bennett's herd of 26, including nine registered cows, averaged 421 lb.

TABLE IX.—TESTED COWS GROUPED ACCORDING TO AREA AND PRODUCTION OF BUTTER-FAT.

Area.	Total Cows.	Showing lb. of Butter-fat Range.						
		Over 800 lb.	700 to 800 lb.	600 to 700 lb.	500 to 600 lb.	400 to 500 lb.	300 to 400 lb.	200 to 300 lb.
Gippsland	41,339	..	..	9	97	1,238	8,264	20,049
Western	30,999	..	..	..	1	58	1,009	15,403
Goulburn Valley ..	15,745	..	..	8	72	748	4,446	7,336
North East ..	15,926	..	1	1	32	284	2,170	7,279
Totals ..	104,009	..	1	18	202	2,328	15,880	50,070
COMPARATIVE FIGURES OF PREVIOUS YEARS.								
1930-31	90,360	1	5	25	219	2,415	16,044	42,278
1928-29	63,277	1	1	12	111	1,108	8,936	28,355

NOTE.—During the year under review, 18,429 individual cows produced over 300 lb. of butter-fat (no age allowances have been made for the 44·6 per cent. of junior cows). This number is 18 per cent. of the total as compared with 20 per cent. in 1930-31 and 16 per cent. in 1928-29—when a much lower percentage of junior cows was under test.

butter-fat. Sixteen cows exceeded 400 lb., and two did better than 500 lb. The three leading cows in the herd are grade daughters of "Banjo of Warenda," an unusually successful Jersey sire. At Maffra, thirteen of Mr. R. Rautmann's herd exceeded 400 lb. butter-fat, "Creamy," his top cow, producing 618 lb.

Some of Mr. G. Duck's Friesian-Shorthorns. This herd of 36 head, on pasture only, had an average yield of 384 lb. butter-fat.

Mr. J. Sury and Mr. A. Freestone, of the Murchison North Association, each reached the 400 lb. class, while the herds of Mr. G. Petersen, of Newstead, Mr. J. Ryan, of Warragul, and Mrs. W. Campbell, of Tongala, were all close up to this mark. Thirty-five herds exceeded 360 lb. butter-fat, in the section 20 to 40 cows (Table II.), while many others gave over 350 lb.

Although no herds in the 40 to 60 cows (Table III.) section exceeded 400 lb., some were very close to that level. The average of 391 lb. by Mr. D. Dowsen's herd of 45 at Wonthaggi was a fine performance. The well-known herd of Mr. Don Brown, of Myrtleford, again performed well, 47 cows averaging 386 lb. butter-fat.

At Leongatha, Mr. J. G. Howell's herd of 41 cows, with 50 per cent. junior cows, made 381 lb., eighteen members of the herd exceeding 400 lb. butter-fat, and three giving over 500 lb. During the past four years the 400-lb. mark has been reached in 50 instances by members of Mr. Howell's herd; on six times, 500 lb. and over has been reached. At Loch sixteen of Mr. F. Glover's herd of 45 cows exceeded 400 lb. butter-fat, two being over 500. The herd average was 381 lb. butter-fat. At Leongatha, Mr. Ken Gunn's herd of 40 cows produced 371 lb. In this section there are some splendid herds of up to 60 cows, whose records speak of a high degree of farm and herd management.

As the herd size increases greater difficulty is experienced in maintaining the butter-fat level. Among the leading herds in the 60 to 80 cows section appear the records of some of this State's outstanding herds. That of the late Mr. Jas. Clyne, of Maffra, probably has no superior in Australia. Originally it was of Shorthorn breeding. Size, substance, and dairy quality are combined in this herd to a very remarkable degree. There are sixteen living cows on the farm, with records of over 500 lb. butter-fat, three of these have exceeded 600 lb., and one 700 lb. During 1933, the herd of 67 cows averaged 371 lb. of butter-fat; 23 cows exceeded 400 lb.; ten returning more than 500 lb. More than 30 records of 500 lb. have been made during the past five years.

At Warrnambool the herd of Batten and Sons also is of unusual merit. Eighty cows

TABLE X.—SHOWING DISTRIBUTION OF JUNIOR COWS ACCORDING TO AREA AND PRODUCTION OF BUTTER-FAT, 1932-3.

Area.	Junior Cows.		Three-year-old Heifers tabulated according to Production of Butter fat.				Senior and Junior Two-year-old Heifers tabulated according to Production of Butter fat.			
	Number.	Percentage of Total.	Over 500 lb.	400 to 500 lb.	300 to 400 lb.	Percentage over 300 lb.	Over 500 lb.	400 to 500 lb.	300 to 400 lb.	Percentage over 300 lb.
Gippsland ..	18,138	43·8	14	137	1,182	7·3	6	64	1,107	6·4
Goulburn Valley ..	8,551	54·3	4	126	637	8·9	5	55	754	9·5
North East ..	7,079	44·4	4	24	279	4·3	..	9	218	3·2
Western ..	12,624	40·7	3	50	523	4·5	3	66	825	7·0
Total Juniors	46,392	44·6	25	337	2,621	6·4	14	194	2,904	6·7

averaged 358 lb. of butter-fat; there were seventeen junior two-year-olds, and nineteen others calved under four years of age. Twenty-four of these junior cows exceeded 300 lb.—the top being "Ada," a junior two-year-old which produced 382 lb. Here, again, selected bulls and intelligent farm management were the outstanding features of the farm development. Each spring, during the peak of production, this large herd averages close to 2 lb. of butter-fat a day.

Eastern Gippsland appears to be the home of the State's best large herds. Each year Messrs. Foster Brothers, Clyne Brothers, and Moore and Company appear in the section for large herds. Messrs. Foster Brothers' 61 cows with 349 lb. butter-fat, and 63 cows with 323 lb. of butter-fat, put up fine performances.

Mr. R. Buchanan and Mr. E. Bournan, of Tallangatta, with herds of approximately the same size, have similar productive types. The honour of owning the largest herd averaging over 300 lb. butter-fat per cow again belongs to Mr. Wm. Gunn, of Leongatha. His 198 cows (including 104 juniors) averaged 324 lb., 53 of the junior cows having exceeded 300 lb. Messrs. Moore and Company, of Yarram, with 103 cows, have the higher average of 332 lb. Mr. P. Hickey, of Cobden, with 85 cows, also exceeded 300 lb., while Mr. A. Cameron, Pardew Brothers, and Mrs. A. Nixon, all of

TABLE XI.—TWENTY LEADING HERD-TEST COWS WITH DETAILS OF OWNERSHIP, IDENTIFICATION, AGE, RECORD OF PRODUCTION, AND BREEDING OF SIRE.

Owner.	Association.	Name.	Brand.	Age.	Lb. Milk.	Per-centage.	Lb. Butter-fat.	Sire.
Executors Mrs. T. Payne	Seymour-Kilmore	Marsden Mindful (imp.)	Regstd.	6	15,672	4·6	723	Reg. Red Poll
P. Gannon ..	Maffra ..	Ponsie	CV 2	2	12,474	5·4	682	Unknown
			3	3	11,934	5·6	670	
Moore and Co.	Yarram ..	Pride ..	V 10 184	M.	12,204	5·37	656	Reg. Jersey
W. Waterhouse	Pakenham ..	Princess III. ..	Regstd.	M.	10,987	5·97	656	Reg. Jersey
G. Clyne ..	Maffra ..	Graceful ..	V 2 102	3	11,524	5·6	651	Reg. Jersey
G. Beasley ..	Swan Hill ..	Cocky ..	S 10 11	M.	12,685	5·12	650	Jersey
J. McLeod ..	Bunyip ..	Daisy ..	Y 3 1	M.	12,062	5·29	639	Grade Jersey
H. McRae ..	Rochester ..	Jennie ..	ER 3 1	M.	11,477	5·46	628	Reg. Jersey
B. M. Robbins	North Murchison	Queenie ..	NR 4 26	M.	11,525	5·4	622	Unknown
Mrs. H. Soutar..	Rochester ..	Ramonia ..	ER 4 2	M.	11,795	5·23	618	Grade Shorthorn
R. Rautmann ..	Maffra ..	Creamy ..	V 14 12	M.	9,949	6·2	618	Grade Jersey
W. McConnell ..	North Shepparton	Inka Cardelle ..	Regstd.	M.	18,162	3·4	617	Reg. Friesian
W. Smith ..	Warragul ..	Sweet Briar ..	Regstd.	3	11,408	5·4	616	Reg. Jersey
A. Robinson ..	Rochester ..	Lucy	R	M.	14,610	4·2	614	Grade Ayrshire
Sheppard Bros.	Kerang ..	Queenie ..	JH 18 6	M.	12,042	5·09	613	Reg. Jersey
H. Loader ..	Rochester ..	Joan	R	M.	11,703	5·21	610	Reg. Jersey
Ken. Gunn ..	Leongatha ..	Jacky ..	L 3 21	M.	11,469	5·3	609	Grade Jersey
S. Allen ..	Leongatha ..	Buttercup ..	A 27 8	M.	9,610	6·33	609	Grade Jersey
A. Hulme ..	Milewa ..	Duchess ..	X 9 5	M.	10,226	5·94	608	Reg. Jersey
O. Thaw ..	Stanhope ..	Jewel ..	S 10 17	M.	11,335	5·27	598	Reg. Jersey

NOTE.—All tested cows in herds affiliated with the V.U.C.T.A. must carry the brand of the unit, the herd, and the number in that herd. For example, Mr. Gannon's "Ponsie" is No. 3 cow in No. 2 herd of a unit of the Maffra Association.

Orbost, together with J. R. Mann, of Penshurst, and Clark Brothers, all have good results from such large herds.

A noteworthy feature of the leading herds in each section is the continued use of selected pure production-bred herd sires.

Table IX. shows that no fewer than 18,429 cows (including 6,095 juniors) exceeded 300 lb. of butter-fat; 221 cows exceeded 500 lb., and nineteen passed the 600-lb. mark.

Portion of the herd of the estate of the late J. Clyne. This herd of 67 cows averaged 372 lb. butter-fat.

The leading cow for the year was Marsden Mindful, a Red Poll cow, imported by the late Mr. T. H. Payne, who for many years was a staunch supporter of the herd-recording system. Her yield for the test period totalled 723 lb. butter-fat. The highest milk yield for the year was given by "Inka Cordelli," a registered Friesian, owned by Mr. McConnell, of North Shepparton Association. Her record was 18,162 lb. of 3.4 per cent. milk, or 617 lb. butter-fat. It will be noticed that seventeen of the twenty top cows shown in Table XI. have a percentage test of more than 5 per cent. butter-fat, and that eighteen gave more than 1,000 gallons of milk.

Among the 39 junior cows to exceed 500 lb. of butterfat are two unusually precocious individuals. "Ponsie," a young cow owned by Mr. P. Gannon, of Maffra Association, bids fair to surpass the wonderful figures of Mr. A. Moore and Company's "May," which was shown in the 1931 report to have produced a total of 1,790 lb. butter-fat on her first three lactations. Beginning at about seventeen months of age, "Ponsie" produced 339 lb. butter-fat; she calved again while still under two and a half years, and in her second lactation produced 680 lb. Before she was four years old she had calved a third time, and in her third lactation yielded 690 lb. In the two past years she has finished her test on 36 lb. of milk daily. During the current period, she has produced 427 lb. butter-fat in 157 days, and looks like making a new record.

"Graceful," a three-year old, owned by the late Mr. Jas. Clyne, is also a remarkable young cow. As a senior two-year-old she produced 565 lb. butter-fat, and followed with

Table XII.—Western Area.

Unit or Association.	No. of Herds.	No. of Cows.	Average Yield of Butter Fat.	Percentage of Junior Cows.	No. of Pure-bred Bulls.
			lb.	%	
Dreeite South ..	28	848	284·7	42·4	28
Derrinallum ..	26	852	275·6	48·7	24
Warrnambool ..	21	1,077	273·9	36·5	21
Talbot	13	241	270·5	35·6	8
Winchelsea No. 1 ..	28	822	268·0	46·2	24
Becac	27	920	262·0	41·4	20
Nalangie No. 1 ..	22	836	257·2	43·6	15
Camperdown ..	22	863	254·7	35·0	16
Casterton	25	748	253·6	44·3	19
Nalangie No. 2 ..	20	832	253·0	46·9	14
Cobden	27	1,273	250·9	36·6	..
Ondit	25	937	250·0	38·1	22
Condah Swamp ..	27	762	248·6	40·2	25
Pomborneit	23	1,035	246·4	40·3	15
Newstead	26	712	244·7	46·7	23
Mortlake	27	955	244·2	33·2	15
Noorat No. 1 ..	23	1,211	243·7	24·1	19
The Sisters	27	1,101	242·5	42·6	32
Noorat No. 2 ..	24	1,118	239·4	38·7	17
Nalangie No. 3 ..	27	871	237·8	45·0	20
Coleraine No. 2 ..	18	628	237·1	42·9	9
Penshurst	23	798	234·0	52·3	27
Gellibrand Valley ..	26	761	233·3	24·7	16
Macarthur	19	642	232·8	45·1	16
Ballarat	28	481	228·7	50·3	19
Wurt Wurt Koort ..	12	928	227·0	39·6	21
Portland	17	357	227·0	49·0	12
Keayang	7	499	226·0	28·2	19
Coleraine No. 1 ..	21	755	224·1	44·5	19
Winchelsea No. 2 ..	28	681	215·0	49·9	22
South-Western ..	22	813	214·2	29·0	20
Merino	23	694	212·1	41·9	24
Coleraine No. 3 ..	14	1,003	208·9	35·1	37
Ecklin	19	712	208·2	51·1	30
South Purrumbete ..	22	911	206·1	29·4	7
Apollo Bay	27	655	203·9	49·4	13
Port Campbell ..	25	882	198·7	50·0	6
Kyneton	24	392	191·2	46·9	7
South Gleneig ..	15	131	183·2	33·3	8
Geelong	25	262	146·7	55·3	12
Totals ..	903	30,999	233·6	40·7	80%

a record of 650 lb., though for part of the time, following an accident, there were only three sound quarters in her udder. "Grace II.," her dam, has three records of over 500 lb.; while her grand dam "Grace" has a six years' average of 472 lb.; one over 500 lb.

There are 2,619 pure-bred bulls in use in the herds of the members of affiliated associations; this figure represents 77 per cent. of the total herds. Of the breeds used, the Jersey is the most popular, the proportions being—Jersey, 74.4 per cent.; Ayrshire, 10.3 per cent.; Friesian, 4.4 per cent,; Guernsey, 1.3 per cent.; Shorthorn and A.I.S., 6 per cent.; and Red Poll, 3.6 per cent.

Tables XII. to XV. show the numbers of herds and cows, average butter-fat production per cow, percentage of junior cows, and the number of pure-bred bulls in use in each unit.

TABLE XIII.—NORTH-EASTERN AREA.

Unit or Association.	No. of Herds.	No. of Cows.	Average Yield of Butter Fat.	Percentage of Junior Cows.	No. of Pure-bred Bulls.
					%
Tallangatta No. 1 ..	25	936	264·8	50·6	22
Seymour	15	289	263·3	58·1	10
Myrtleford No. 2 ..	15	510	256·8	43·1	16
Myrtleford No. 1 ..	19	515	252·0	48·7	19
Eskdale	21	920	244·5	32·7	18
Swanpool No. 2 ..	26	660	243·6	51·5	18
Tallangatta No. 2 ..	26	940	243·2	45·9	20
Moyhu	26	688	239·5	53·7	13
Alexandra	24	720	237·7	52·2	23
Upper Murray No. 2 ..	27	1,055	230·4	35·6	32
Eskdale No. 2 ..	19	600	226·2	37·0	13
Milawa No. 2 ..	25	791	221·5	49·8	13
Myrtleford No. 3 ..	22	624	220·9	39·7	19
Wodonga	17	596	220·6	50·6	19
Kiewa Valley No. 2 ..	20	937	220·4	35·4	..
Milawa No. 1 ..	26	809	218·9	47·9	19
Kiewa Valley No. 1 ..	23	1,001	212·0	42·5	..
Swanpool No. 1 ..	28	792	210·6	44·8	27
Upper Murray No. 1 ..	27	1,153	193·2	31·8	32
Walwa	28	926	173·5	57·4	19
Euroa	26	464	166·6	43·9	6
Totals ..	485	15,926	225·2	44·4	74·2%

TABLE XIV.—GOULBURN VALLEY.

Unit or Association.	No. of Herds.	No. of Cows.	Average Yield of Butter Fat.	Percentage of Junior Cows.	No. of Pure-bred Bulls.
					%
Rochester No. 1 ..	25	477	319·8	57·8	..
North Murchison No. 1 ..	25	604	296·4	51·1	20
Rochester No. 2 ..	23	435	295·6	56·0	19
Tongala No. 1 ..	27	677	290·9	53·9	27
Werribee South ..	19	489	290·0	48·6	20
North Shepparton ..	26	452	289·0	51·9	25
Stanhope No. 1 ..	28	671	287·4	50·2	26
Kerang No. 2 ..	28	679	285·0	48·7	26
Swan Hill	28	701	283·8	55·7	28
Tongala No. 2 ..	27	790	283·3	59·8	27
Katandra West ..	26	468	280·0	64·0	19
Undera	26	651	279·1	56·3	18
Leitchville No. 1 ..	27	1,020	270·1	43·0	35
Cohuna No. 1 ..	27	890	256·5	57·1	17
Stanhope No. 2 ..	25	308	251·4	58·1	24
Pyramid Hill ..	26	751	247·9	52·3	13
North Murchison No. 2 ..	23	453	247·0	57·8	23
Leitchville No. 3 ..	27	911	239·3	50·0	23
Leitchville No. 2 ..	27	849	237·1	45·7	24
Cohuna No. 2 ..	22	442	234·4	51·1	10
Koroop No. 1 ..	28	985	233·1	57·4	10
Kerang No. 1 ..	27	825	231·0	60·2	27
Murrabit	31	558	230·7	54·0	24
Koroop No. 2 ..	28	659	210·6	67·8	16
Totals ..	626	15,745	254·8	54·3	79·6%

TABLE XV.—GIPPSLAND.

Unit or Association.	No. of Herds.	No. of Cows.	Average Yield of Butter Fat.	Percentage of Junior Cows.	No. of Pure-bred Bulls.
					%
Maffra No. 1 ..	27	1,100	306·8	43·6	27
Dumbalk North ..	26	1,018	291·9	43·3	18
Pakenham	27	616	291·2	54·3	28
Warragul No. 2 ..	27	583	287·3	49·2	17
Yinnar No. 1 ..	26	736	286·0	46·8	14
Bunyip	26	482	283·5	50·2	19
Narracan No. 1 ..	25	553	277·3	45·2	16
Warragul No. 1 ..	27	709	270·6	46·5	25
Jindivick–Neerim No. 3	24	505	270·6	44·5	18
Leongatha No. 1 ..	24	637	270·3	54·6	16
Maffra No. 2 ..	25	990	267·0	46·8	19
Dumbalk	26	726	266·1	40·1	17
Narracan No. 3 ..	25	482	266·1	52·5	16
Lang Lang No. 2 ..	20	470	261·6	54·0	18
Wonthaggi	26	624	260·2	57·7	24
Jindivick–Neerim No. 2	25	588	260·1	43·3	10
Sale	27	811	259·8	37·9	19
Loch	27	780	257·3	55·9	14
Jindivick–Neerim No. 1	26	617	257·3	44·2	20
Maffra No. 6 ..	9	331	256·7	55·0	7
Narracan No. 2 ..	27	620	255·8	49·8	19
Yarram No. 1 ..	26	973	254·3	40·5	26
Boolarra No. 2 ..	18	462	254·3	58·2	21
Gainsborough ..	24	819	254·0	46·6	15
Toora No. 1 ..	26	692	252·5	35·5	27
Stony Creek ..	28	787	251·2	50·0	21
Leongatha No. 2 ..	26	746	250·6	47·8	16
Maffra No. 4 ..	22	991	250·0	42·3	18
Mountain View ..	26	737	249·8	47·6	15
Traralgon	24	875	249·3	46·1	20
Maffra No. 5 ..	27	996	249·0	47·1	24
Mornington	31	365	247·6	46·0	18
Leongatha No. 4 ..	25	750	247·0	48·3	14
Korumburra No. 2 ..	27	899	246·1	51·0	22
Maffra No. 3 ..	26	1,000	245·7	32·6	14
Korumburra No. 1 ..	27	840	242·2	52·5	21
Lang Lang No. 1 ..	26	577	240·9	55·5	22
Yinnar N. 3 ..	26	731	238·6	37·7	20
Poowong No. 2 ..	22	662	238·6	54·1	21
Leongatha No. 3 ..	24	862	237·0	52·5	19
Mirboo North No. 2 ..	23	604	232·6	59·4	10
Warragul No. 3 ..	25	703	232·5	50·9	15
Traralgon No. 3 ..	23	939	231·1	50·5	21
Kongwak	26	959	229·6	41·7	18
Orbost	24	1,518	229·1	45·1	24
Bairnsdale	22	630	226·9	43·5	16
Fish Creek	24	614	225·0	47·7	10
Yinnar No. 2 ..	25	663	224·2	48·7	16
Mirboo North No. 1 ..	23	552	223·5	52·0	14
Poowong No. 1 ..	19	673	222·7	57·1	13
Yarram No. 2 ..	25	959	211·8	40·0	25
Boolarra No. 1 ..	25	574	211·7	39·6	19
Traralgon No. 2 ..	21	917	211·4	46·2	17
Foster	24	662	205·4	41·7	18
Tarwin Lower ..	24	1,270	202·7	27·4	32
Cann River	13	360	197·9	33·0	14
Totals ..	1,369	41,339	247·8	43·8	75·7%

Pasture Improvement Work

Gippsland and Western District Trials

Second annual report on the pasture experimental work conducted by the Department of Agriculture under arrangement with the Victorian Pasture Improvement League. This work was designed by the Director of Agriculture, Mr. H. A. Mullett, B.Agr.Sc., and is being conducted under the supervision of the Agricultural Superintendent, Mr. J. Brake, B.Agr.Sc. The field work is being carried out by Messrs. R. L. Twentyman, B.Agr.Sc. ; F. S. Crawford, M.Agr.Sc. ; E. D. Cameron, B.Agr.Sc., and W. D. Andrew, B.Agr.Sc.

THE main object of the work being carried out by the Department of Agriculture in conjunction with the Pasture Improvement League is to determine the most effective means of improving pastures in the dairying districts of southern Victoria, particularly by the introduction of more productive grasses and clovers, by manuring, and by the better management of the existing pastures.

The preliminary field work involving the selection of sites was begun in February, 1932, and the plots were sown and manured during May and June of that year. The establishment of the plots was completed in 1932, and a record of the location of sites, the plot treatments, and the results obtained during the first year is to be found in the first annual report issued in 1933.

Plots have been continued on the sites as selected in 1932. In a few cases small extensions to the experiments have been made in order to investigate further results already

obtained. This has been done only where marked variations have been obtained and it is desired to secure confirmation before proceeding to more detailed experiments.

Maintenance of Plots.

Close observations have been made on the plots during the past year in order to record changes occurring from time to time. During this period the swards have become more stable, and have not been subject to the rapid changes experienced in the first season.

The autumn dressing of manure was applied to all plots during April and May, and a spring dressing of sulphate of ammonia was given to the nitrogen-treated plots early in August. In the first year the "Super., 3 cwt. per acre" plot received the manure in one dressing in the autumn, but last year 2 cwt. was applied in the autumn and 1 cwt. in spring.

During the period under review it was not found necessary for mowings to be made as frequently as had been expected, owing to the very dry weather experienced during the autumn and winter. During the year it has been possible to give the plots a longer period for recovery between cuttings, as the motor mowers were fitted with cutting cylinders of larger diameter, which enabled them to remove cleanly the growth from the plots even where the grass had become long.

The rotational grazing plots have been fed off at regular intervals, and were kept well in hand during the spring. The difficulty experienced in the first spring of keeping the grazing areas in a short pasture condition was not met in the past spring, as the period of flush growth in that season was very limited.

Fencing and Water Supply.

The fences, which have been maintained in good condition, have proved quite effective in controlling the stock. Unusual activity on the part of young stock at Larpent made it necessary to add a further barb to the subdivision fences to control them, but on the other plots the original fences have been quite satisfactory.

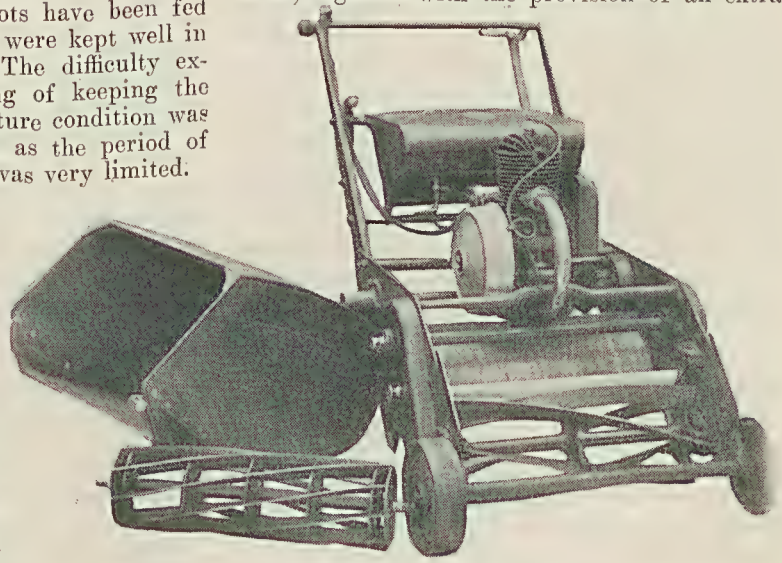
Arrangements made for the water supply on the grazing areas have worked satisfactorily, and no further expense was incurred on this account during the past year. Water has not yet been laid on to the Larpent plots, and it has been necessary to make other arrangements for the watering of the stock there.

Large descriptive labels setting out the nature of the experiments, and the arrangements under which they are being conducted, were erected on both the "major" and "pilot" plots during the autumn. These, together with the small labels, complete the labelling of the plots, and enable the lay-out to be readily understood.

Consideration is also being given to the erection of directional labels where plots are not on main roads; also, the provision of stiles on plots to facilitate inspection without damage to fencing.

Equipment and Transport.

Excellent service has been given by the two motor cars and trailers, which are still in good condition. The cost of repairs and replacements to these vehicles has been small, and their actual running costs have been low. The motor lawn-mowers have proved efficient and reliable in harvesting the plots. The fitting of large-diameter cutting cylinders has enabled them to cut cleanly grass which previously necessitated double cutting. This arrangement, together with the provision of an extra

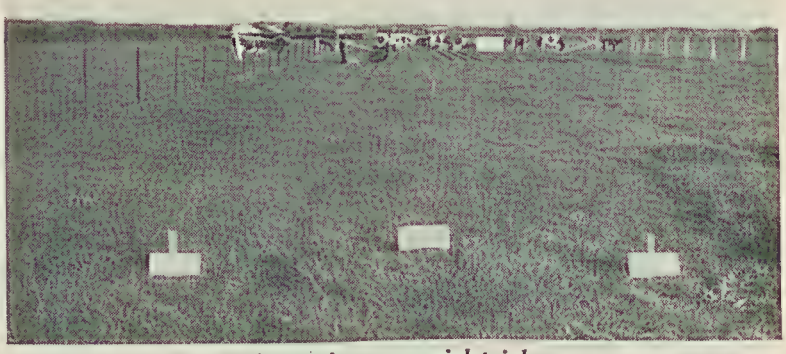


One of the motor mowers used on the plots showing left, grass catcher and small cutting cylinder replaced by larger diameter cylinder to enable longer grass to be cut.

large grass box, has greatly reduced the time taken to cut and weigh the produce from the plots.

At present the only means of controlling the growth on the pilot plots is to have them fed off from time to time with stock, with an occasional mowing late in the spring. Unfortunately, during the spring the plots make vigorous growth which, becoming unpalatable, is not readily eaten, and the sward then tends to become rough and get beyond the pasture stage. In order to overcome this difficulty, steps have been taken to obtain a machine recently developed in England, with which the plots will be mown when necessary.

As yet it has not been possible to obtain suitable small experimental manure spreaders for use on the plots, and, except in the case of the grazing areas, all manures have had to be distributed by hand.



A mowing manurial trial.

Botanical Survey of Plots.

Botanical surveys were made on all plots during the year, and records have been kept of the compositions of the swards on the variously treated areas.

In the pasture mixture sections, marked differences in composition have already been recorded, but, generally in the manurial section, no great differences have been recorded. Where pronounced growth responses have been produced as a result of a manurial treatment the composition of the pasture has been altered in some instances, but in those cases where the response has been small the alteration in composition usually has not been noticeable. In fact, with a knowledge of the time and extent of increased growth and the nature of pasture being experimented with, the change in botanical composition of the sward under normal seasonal conditions can be forecast with reasonable certainty.

The most powerful influence affecting the botanical composition of a sward growing under favorable soil conditions is that exerted by the stage of growth at which the pasture is grazed, close grazing being particularly favorable to the development of white and subterranean clovers, whereas lenient grazing encourages the taller-growing species, such as ryegrass, cocksfoot, Yorkshire fog, soft brome, and Festuca bromoides. Already, in a number of cases, marked changes in composition of the pastures have been observed, resulting directly from closing the paddocks to indiscriminate grazing. It is apparent that pasture management directed mainly towards controlling the stage of growth at which a pasture is grazed can rapidly alter the composition of the sward, and it is desirable that the details of the methods by which this can be most readily brought about should be investigated, particularly with a view to introducing grasses into established subterranean clover pastures.

Pasture Survey.

Work on the survey of the pastures of the dairying districts of southern Victoria was begun late in the spring, when the appearance of the seeding heads enabled the various constituents of the swards to be readily identified. In view of the large area to be traversed it was essential that rapid identifications be made, and this work of necessity has been restricted to the late spring and summer months. The work was commenced in the Western District in December, and was continued during January. Records of the type and extent of the pastures encountered have been made, and an endeavour is being made to correlate them with aspect, soil, and climatic conditions.

Analyses of Soils.

Soil samples for both chemical and physical determination have been taken from all plots. These have been submitted to the Agricultural Research Chemist for analysis, but, while the chemical analyses are now to hand, it will be some time before the physical determinations are available. In many cases a relationship

A field day at Yarragon plots.

between the chemical analysis and manurial response has been noted. Chemical analysis, however, cannot be regarded as a definite indication of the fertilizer treatment required.

Field Days.

During the past spring field days were conducted on all the "major" plots. These were held about mid-October in the Western District, and early in November in Gippsland. Although, numerically, the atendances in the Western District were rather disappointing, those present expressed keen appreciation of the work, and should form the nucleus of better gatherings to be expected on future occasions. In Gippsland excellent attendances were obtained and a keen interest in the work was manifested. From the past season's experience it is evident that for better demonstrating the value of the application of artificial fertilizers to pasture land it will be desirable to conduct future field days earlier in the spring.

Weather Conditions during 1933.

The autumn and winter periods of 1933 were abnormally dry, there being an almost complete absence of the usual autumn rains. On most of the plots this resulted in a marked reduction in the proportion of the annual constituents of the pasture, owing to their failing to germinate and establish in the autumn. Many pastures which normally possess an abundance of either subterranean clover or the annual trefoils showed an almost complete absence of these plants.

On account of the absence of rain, growth during both autumn and winter was light, and from the point of view of actual bulk of growth the autumn response to the manures was disappointing. These dry conditions continued until the early spring when with the advent of good rains, the grass came away well, reaching the peak period of growth in October.

From then on dry weather was experienced, and the late spring growth was rapidly checked. Early pastures, consisting of annual grasses and clovers, matured quickly and dried off. In the later districts the pastures were grazed close, and the heavy rains which fell early in December have enabled them to make prolonged growth into the summer.

It was only in the early districts that the grass on mainly annual pastures made sufficient surplus growth to enable meadow hay to be cut.

SUMMARY OF RESULTS.

Manurial Trials—Mowing and Pilot (observation) Plots.

The first applications of manure were made eighteen months ago, and it is reasonable to assume that sufficient time has elapsed to enable these materials to show their beneficial effects, if any. In this regard it might be pointed out that no plots which failed to show any appreciable benefit during the first year have shown any material response in the second year with the exception of a small response to potash on the Gippsland major plots.

Nitrogen.

The response to dressings of sulphate of ammonia has been one of the most regular features of the manurial experiments. Dressings of this fertilizer were applied, both in the autumn and late winter, and on almost every plot a considerable percentage increase in growth was obtained. While the percentage increase often has been large, the actual increase in bulk of greenstuff has not been very great, the main virtue of this material being its ability to stimulate growth retarded by the cold winter conditions. There is no doubt that under Victorian conditions there is usually a deficiency of soil nitrogen during the autumn, winter, and early spring months, and that the application of nitrogenous fertilizer at this time will stimulate growth.

That this stimulus to growth may be turned to valuable account was exemplified on some

of the "pilot" plots, where an application of an early spring dressing materially improved the establishment of backward autumn-sown pastures.

On the mowing plots under conditions of repeated cutting the response to nitrogen is of short duration only, and has seldom been sustained longer than two months following the application. On the pilot plots, where the grass is only partially grazed, this stimulus to growth may be observed for a much longer period.

Superphosphate.

Striking increases in growth have been obtained on many of the plots as a result of the use of superphosphate, and only in very few cases has no material benefit been recorded. Increased growth has been produced on both the mowing and grazing plots, and on the latter it has been accompanied by increased palatability of the feed.

The response to all manures was retarded during the autumn of 1933 owing to dry weather, but the plots treated with superphosphate showed improved growth in the late winter period, and made a rapid recovery of growth early in the spring. Although very marked early in the spring, this increase was less obvious during the period of flush growth.

The use of 3 cwt. of superphosphate per acre has not given any substantial increase over the "Super., 2 cwt." plots, its main benefit being an increased growth late in the spring rather than during the winter.

Ephos Phosphate.

Very little response has been observed from the use of this slowly-soluble phosphatic fertilizer. Plots so treated are generally showing a somewhat better growth than the unmanured plots, but they are not to be compared with those treated with superphosphate.

Blood and Bone.

Some response to blood and bone was observed on those areas showing a marked response to superphosphate, but again the response has been much smaller than that obtained with the superphosphate.

Potash.

Potash has given small increases on most of the major plots in Gippsland, while, in the Western District, substantial increases in pasture growth have been recorded on the Larpent and Cobrico plots.

A heavy dressing of potash—5 cwt. per acre—was applied in the early spring of 1933 to small sections of the potash strips on the mowing and pilot plots, with the expectation that it might encourage a response where the 1-cwt. dressings had failed. As yet no response above what had already been observed with the lighter dressings has been seen on these areas.

Lime.

A dressing of lime, equivalent to 1 ton per acre of high-grade agricultural lime, was applied to strips on all plots early in 1932. While most of the plots have not shown any improvement from its use, in a few cases its application has been followed by an increased growth. Plots situated in the hill country of Gippsland usually have shown some increase in growth, but it will be necessary to determine how long this improvement lasts before the treatment can be advocated. At Heywood and Timboon marked responses to lime have been recorded, but the remaining Western District plots have not been visibly improved.

A fodder analysis of clippings taken from limed and unlimed plots on both responsive and unresponsive areas failed to show any material effect on the mineral content of herbage from the dressing of lime.

Manurial Trials—Rotational Grazing Plots.

Observations made upon the rotational grazing plots indicate that their response to manure is almost identical with that recorded on the mowing manurial areas. Similar responses have been observed in the case of both nitrogenous and phosphatic dressings, but the cross strips of potash have not shown up on the grazing plots at Larpent and Cobrico as they have on the mowing areas.

A comparison of the results obtained from the mowing and grazing plots would indicate that the latter have not responded to the manurial treatments as much as the mowing plots. This difference is due, in the main, to palatability, and the preference that the stock show for the manurial areas. Where the unmanured plots are markedly inferior to the manured areas the stock are reluctant to graze the unmanured plots, whilst the manured ones are eaten greedily. *Obviously, under these circumstances, the length of time that the stock are grazing on these plots is not a satisfactory measure of their productivity.*

Pasture Mixtures and Strains.

The "pasture mixtures and strains" plots were sown in the autumn of 1932, and this report of their growth during the past year covers their second year of growth, the period in which sward formation should have been taking place. During this period it was very noticeable that those plots sown to the annual and short-lived types of rye-grass, which had made very vigorous growth during the first year made only poor thin growth, and were invaded by weeds. On the other hand, plots sown to the persistent perennial strains which made slower development in the first year, have now developed dense, close swards, from which weeds have been largely excluded.

On most of the sown areas rye-grass has made the greatest development, and constitutes the bulk of the growth. In Gippsland, however, and in several areas in the Western District, cocksfoot has made most promising headway, and in combination with rye-grass and clovers has produced excellent swards.

Throughout the first summer the cocksfoot swards remained green, and during the second summer most of them continued fresh and green, largely as a result of the heavy rains in early summer. Despite the heavy late spring and early summer rains, it was only in isolated cases that the pastures made much summer growth, and at the end of February they were in a very dry condition. Where present, cocksfoot, paspalum, and red and strawberry clovers have responded well to the rains, but most of the other species made only weak renewed growth.

Generally brown top, Chewing's fescue, and Yorkshire fog have made good establishment on all plots, while, prairie, Kentucky blue, crested dogstail, timothy, and meadow foxtail have made fair growth in a few places only.

Although Phalaris has become established on most of the Western District plots, its progress usually has not been satisfactory, its growth generally being weak and sparse, with no tendency to form a sward. In the Gippsland plots its development has been very slow, and even now it is present in only small amount. The establishment of Phalaris tuberosa in competition with other species will be the subject of further investigation.

The past year being unusually dry during the autumn and winter, the development of clover throughout the pastures was very poor. The season was particularly unfavorable for subterranean clover, and its headway on the plots was checked. White clover made good headway on the wet flats of Gippsland, but its growth was checked by the dry conditions on the other sites. In the Western District the white clover became prominent only where the thin swards of the weak rye strains permitted its free entry and establishment. Its growth during the early summer was encouraged by the heavy rains, but the following hot weather soon checked it. Rather better summer growth has been made by the red clover which has withstood the hot weather better than the white Dutch.

Alsike clover, Lotus major, and strawberry clover have made satisfactory growth in a few isolated cases only. The lucerne never really became well established, although its germination was good, and early growth quite satisfactory.

The sown-down sections have received a dressing of 1 cwt. of superphosphate per acre each autumn. Further dressings of sulphate of ammonia, at the rate of 1 cwt. per acre, were applied in strips across the sown-down areas early in the spring. Although a visible increase in growth generally has resulted from this nitrogen dressing the increase has been neither marked nor prolonged.

Weed Growth.

In the first season following the sowing of the seed, weed growth was troublesome on some of the plots, but during the second year very little difficulty has been experienced. At Cudgee, South Ecklin, and Port Fairy, weeds resulting from the ploughing having brought buried weed seeds to the surface caused a dense smother crop of weeds, which checked the pasture growth during the first year. These plots were mown at the end of the spring, and since then the swards have become well established, and are now relatively clean.

On the light volcanic soils of the Western District, where annual grasses and trefoils usually make vigorous winter growth, their development this year was checked by the dry weather during the autumn and winter. In fact, throughout the stony rises of the Western District, where burr trefoil usually makes prolific growth, it was almost entirely absent during the past year.

In Gippsland, during the first year, troublesome weed growth was confined mainly to the plots on the wetter areas, and on these juncus, carex, loosestrife, docks, Yorkshire fog, bent

grass, and suckling and white clovers were prominent, and these retarded the progress of the sown species. Since then these plots generally have made satisfactory headway, but in some cases a prolific growth of volunteer white clover has developed. On the drier plots, situated on the hill country of Gippsland, flatweed and plantains are developing on the weaker swards.

As a general rule, on the Gippsland plots, weeds have been troublesome only where the soil conditions have been unfavorable for pasture establishment, and where these were favorable dense swards were developed and the weeds suppressed.

A field day on the Korumburra plots.

Botanical Survey.

From time to time surveys have been made on the plots to determine the composition of the various swards and record their responses to various treatments. On the sown-down section large differences in composition have been recorded, and these changes being reasonably permanent and stable, make interesting definite records. Botanical surveys made on the swards of the manurial plots which have been laid down on old-established pastures in many cases have revealed very large differences resulting from the fertilizer treatment.

The results have shown that the fertilizer treatment can exert a powerful influence, either directly or indirectly, on the composition of the pasture, but the permanency of this change depends largely on the subsequent treatment of the pasture. The stimulation of pasture growth by means of fertilizer treatment is most marked during the period between late winter and mid-spring, and the application of fertilizer results in the encouragement of those species which normally commence vigorous growth during this period. Where this increased growth is removed, either by grazing or mowing, the alteration in the composition of the sward is not marked, as the bottom plants are permitted to recover from the smothering effect of the taller species. Should the increased growth not be removed, but be permitted to stand on the plot, then the alteration to the composition of the sward may be large and permanent. It is for this reason that the changes in the swards on the mowing plots have been observed to vary from those recorded on the rotational grazing, and the pilot plots which depend on grazing for their defoliation.

In the case of the grazing plots which, after manuring, are closed to stock, the stimulated growth if not controlled is likely to become unpalatable and is not eaten by the animals. As a consequence, these plots tend to become rough and tufty, the bottom growth is suppressed, and the balance of the sward is upset.

The direct changes in composition brought about by the application of manure are small compared with the large changes resulting from the combined effect of stimulated growth, and increased competition resulting from the reduced palatability of the taller-growing species which check the bottom species. Consequently the change in composition of the "mowing manurial" plots, where frequent defoliations are made is less marked than the change in composition of the similarly manured rotational grazing plots and pilot plots where the increased growth may remain standing for months. On these plots the extent of the change in the composition of the sward is dependent on the rapidity and completeness with which the stimulated excess growth is removed.

Other marked changes in sward composition have been recorded following on the fencing off of the small pilot plot areas. In those cases where the pastures had previously been subjected to almost continuous grazing the grazing at infrequent intervals has completely altered the balance of the sward.

Results of Major Plots

GIPPSLAND

Owing to the fact that stock eat more greedily on the more palatable manured pastures, the "grazing day" method of comparing fertilizer treatments has proved to be inaccurate, and is, therefore, being discontinued.

Comments on the grazing trials are based mainly on field observation.

Caldermeade (J. Davis).

(Grey clay loam flats.)

Growth early in the year was poor, owing to the very dry weather experienced during the autumn and winter. Early spring growth was good, but later on dry weather checked the growth which did not revive with the late spring rains.

TABLE I.—GRAZING PLOTS, CALDERMEADE.

Grazing Commenced.	"Young Stock Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime, 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
Sept. 9 ..	40	40	40	40
Sept. 17 ..	40	40	40	40
Oct. 3	60	60	60	40
Oct. 18 ..	40	40	40	40
Oct. 26 ..	20	20	20	..
Nov. 13 ..	60	60	60	40
Nov. 24 ..	40	40	40	40
1933.				
Jan. 20 ..	40	40	40	40
Mar. 6 ..	30	30	30	30
April 10 ..	30	30	30	15
June 5 ..	40	40	60	40
July 7 ..	40	40	40	20
July 28 ..	20	20	20	..
Aug. 15 ..	100	80	76	19
Sept. 6 ..	45	45	45	30
Sept. 26 ..	45	45	45	30
Oct. 10 ..	80	80	60	40
Nov. 1 ..	80	80	100	60
Nov. 17 ..	80	80	60	60
1934.				
Jan. 8	40	40	40	40

ROTATIONAL GRAZING PLOTS.

The superphosphate, sulphate of ammonia, and potash dressings were applied to these plots on 19th April and the spring dressing of sulphate of ammonia and superphosphate on 31st July. Growth on the "no manure" paddock has always been much less in quantity than on those receiving superphosphate. There was a small response to nitrogen for a short period during the spring, but lime does not appear to have brought about any material improvement. No visible response in growth has been seen on the potash strips. Table I. shows the amount of grazing obtained from each plot.

Over the whole season similar grazing has been obtained from the three manured paddocks, but there was a slight increase due to the application of nitrogen early in the spring.

QUANTITATIVE MANURIAL TRIAL.

Manures were applied to these plots at the same times as on the rotational grazing areas. These plots have been cut at intervals throughout the year, and Table II. shows the amount of produce obtained from each plot expressed as hundredweights of greenstuff per acre.

TABLE II.—MANURIAL TRIALS, CALDERMEADE.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 12 ..	13½	13½	9½	16½	15½	14½
Sept. 16 ..	59½	64	32	64	62½	57
Oct. 17 ..	82	81½	64	75½	75½	82
Nov. 7	45½	42	31½	41½	43½	46½
Dec. 5 ..	84	79	49½	73	78	93
1933.						
Jan. 9 ..	12½	13	10	16½	15	17
Mar. 13 ..	2	2½	2½	3	2½	2
April 19 ..	2½	2½	2½	3½	2½	2½
June 12 ..	6½	8½	3	11	9½	6
Sept. 4 ..	51½	65½	12½	76	78	61
Oct. 2 ..	72½	65	34	69½	68	75
Oct. 30 ..	76	65½	51	64	64	81½
Dec. 11 ..	23½	20	14½	24	21	29
1934.						
Jan. 22 ..	3½	3½	4½	5	4	4½

There has been a very good response to superphosphate. Late in the spring a small increase due to lime and potash was recorded. Nitrogen applied in the early spring effected some increased growth for a short period.

Pasture Mixtures and Strains.

Growth during the autumn was retarded by the lack of rain, and this section did not make good headway until the spring. Rye-grass has made good growth, but the other grasses generally have lacked vigour. Red, white, and alsike clovers have made good progress. A considerable amount of volunteer growth, consisting mainly of white and red clovers, has appeared on this plot.

In the rye-grass strain section the annual rye and false perennial plots now consist mainly of weeds and bare space, there being few rye plants surviving even after eighteen months only.

The perennial rye, New Zealand certified, Western District, Gippsland, and Central Victorian types, have developed good swards after a rather slower beginning than was made by the short-lived types. This plot has been grazed from time to time during the year, and at the end of the growing season was topped with the farm mower.

Toora (J. Kroezen).

(Grey silt loam flats.)

The autumn growth of pasture on this flat country was much better than in most other districts, as fair autumn rains were received. Winter growth, however, was slow, and the spring growth commenced a little later than usual. Later in the spring growth was checked by the dry weather. Following the late rains there was a good growth of subterranean white, and strawberry clovers, and the rye-grass also made good recovery.

Rotational Grazing Section.

The superphosphate, sulphate of ammonia and potash dressings were applied on 24th April, and the spring dressing of nitrogen and super. on 2nd August. A small increase due to nitrogen was noticed in the autumn and spring. The large proportion of clover on this plot may account for the apparent lack of response to nitrogenous manures. There has been a fair response to superphosphate, but potash has given no visible increase. Table III. shows the number of days grazing obtained from each plot.

Table III.—Grazing Plots, Toora.

Grazing Commenced.	"Young Stock Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
Aug. 20 ..	80	120	100	140
Sept. 22 ..	140	140	140	133
Oct. 20 ..	133	114	95	76
Nov. 14 ..	76	57	57	38
Nov. 26 ..	57	57	38	19
Dec. 26 ..	49	49	42	42
1933.				
Feb. 25 ..	42	35	35	28
May 25 ..	80	72	56	40
June 25 ..	56	48	40	32
Sept. 6 ..	63	56	56	48
Oct. 24 ..	60	60	45	..
Oct. 25 ..	100	90	80	60
Nov. 27 ..	90	90	70	60
Dec. 28 ..	70	70	60	50

There has been only a small increase due to nitrogen with a further small increase due to the addition of lime.

Quantitative Manurial Trial.

Manures were applied to these plots at the same time as on the rotational grazing areas. The results are set out in Table IV., which shows the amount of produce obtained from each plot expressed as hundredweights of green-stuff per acre.

There was a fair response to the autumn dressing of nitrogen, but the increase due to the spring application was very small. The response to superphosphate has been more marked during this past season than hitherto, probably due to the effect of the previous top-dressings becoming exhausted. There has been no appreciable response to lime, but a small consistent response has been recorded on the potash plots during the spring months.

Pasture Mixtures and Strains.

Poor growth took place on this section this season as a result of unfavorable weather and soil conditions. Rye-grass, Phalaris, Lotus species, and white and red clovers made the bulk of the growth. During the summer period the *Lotus hispidus* and *L. major* were

growing strongly. The other species have made very little headway. In the rye-grass strain section the annual and false perennial types have practically disappeared, and weeds have taken their place. The perennial types have formed fair swards considering the adverse conditions.

TABLE IV.—MANURIAL TRIALS, TOORA.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super 3 cwt.
1932.						
Aug. 15 ..	22½	24	18	26½	26	27
Sept. 19 ..	46	54½	35	55½	60	51½
Oct. 25 ..	75	72½	75½	75½	71	74
Nov. 8 ..	28	31	20½	29	32	29½
Dec. 8 ..	65	64	49	63½	67	70
1933.						
Jan. 11 ..	12	11½	11	12½	12½	12
Mar. 16 ..	6	6	6	6½	6	6
April 24 ..	5	5	5	5	5½	5½
June 15 ..	13	19½	10	21	22	13½
Sept. 6 ..	53½	57	28	61½	61	51½
Oct. 3 ..	50½	47½	37	47½	52½	55½
Nov. 1 ..	50½	41	40	40½	48½	53½
Dec. 19 ..	19½	17	14½	19	20	21
Jan. 25 ..	17½	18	19	18½	17½	19

Yarragon (B. E. Olsen and E. J. Heggart).

(Grey silt loam flats.)

The autumn and winter growth of pasture on these plots was very slow. There was a marked improvement in the early spring, but dry weather checked the growth, which was much less than in 1932. Late in the year caterpillars made their appearance in the district, and destroyed a good deal of grass. Following on the late rains there was a fair recovery from this damage.

ROTATIONAL GRAZING SECTION.

The superphosphate, sulphate of ammonia, and potash dressings were applied on 27th April, and the spring dressings of nitrogen and superphosphate were made on 4th August. There was a good response to superphosphate, and this has been maintained throughout the spring. Sulphate of ammonia improved the colour of the plots, and gave a small response during late autumn and early spring, but this did not persist after early September. There has been no appreciable response to the dressing of potash. The recovery from caterpillar damage has been very slow. Flatweed and plantain became prominent in the "no manure" paddocks late in the season.

Table V. gives the number of days grazing per acre obtained from each plot.

Approximately equal grazing has been obtained from the two nitrogen paddocks, which are slightly better than the superphosphate only. The "no manure" paddock has always been backward.

TABLE V.—GRAZING PLOTS, YARRAGON.

Grazing Commenced.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.		Super. 2 cwt., S. of A. 2 cwt.		Super. 2 cwt.		No Manure.	
	M.	F.	M.	F.	M.	F.	M.	F.
1932.								
July 5 ..	8	17	10	19	11	16	6	6
July 29 ..	11	..	11	..	11	..	8	..
Aug. 18 ..	24	12	20	4	18	..	9	5
Sept. 3 ..	16	18	18	15	21	8	8	6
Oct. 4 ..	10	9	12	10	11	8	8	6
Oct. 31 ..	25	15	28	17	24	14	17	13
Dec. 4 ..	21	..	24	..	27	..	25	..
Dec. 22 ..	24	..	27	..	23	..	11	..
1933.								
Jan. 10 ..	30	17	32	19	28	16	26	6
Feb. 8 ..	31	43	35	58	29	49	22	48
Mar. 19 ..	15	17	17	19	15	39	16	12
April 9 ..	16	17	18	19	15	16	6	12
May 5 ..	24	22	27	25	15	21	11	10
June 4 ..	50	27	52	39	39	26	20	14
July 25 ..	32	..	38	8	23	..	17	..
Aug. 20 ..	60	..	67	..	56	..	16	..
Oct. 6 ..	31	18	35	21	29	17	11	6
Nov. 6 ..	54	48	44	34	58	62	16	34
Dec. 5 ..	41	..	47	..	31	..	17	..

M—"Milking cow days" per acre.
F—"Follower days" per acre.

QUANTITATIVE MANURIAL TRIAL.

The manures were applied to this plot at the same time as on the rotational grazing areas. Table VI. gives the amount of produce obtained from each plot.

The response to superphosphate has been good, while the addition of nitrogen gave a

further small increase for a short period both in the late autumn and early spring. The further addition of lime has not brought about any significant increase in growth. Potash during the past season has given a small consistent increase in yield.

Pasture Mixtures and Strains.

General growth on this area has been fair in spite of unfavorable weather conditions. Perennial rye-grass and white clover (a good deal of which is volunteer) form the bulk of growth on the area. Other species such as cocksfoot, Phalaris, prairie, paspalum, subterranean clover, and Lotus hispidus have made only poor headway. Red and alsike clovers made good growth, and it was noticeable that towards the end of this season a good deal of strawberry clover was appearing.

Mowing manurial plots in Gippsland. Note the unmanured plot on the right.

In the rye-grass strain section the short-lived types—Wimmera, Italian, and New Zealand South Island—have practically gone, and their place has been taken by white clover and weeds. The perennial ryes on the other hand made slow growth at the start, but have now formed satisfactory swards with practically no difference between the individual strains. This section, too, is now making slow recovery after the attack by caterpillars.

Table VI.—Manurial Trials, Yarragon.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 3 ..	3½	5½	3	3½	3½	4
Sept. 17 ..	14½	22½	10	21½	19	18
Oct. 28 ..	76½	69½	56½	72½	82	73½
Nov. 11 ..	26	27½	18	28½	21	21
Dec. 12 ..	53	49	40½	52	52½	55½
1933.						
Jan. 10 ..	24	20½	17	22½	22½	24½
Mar. 14 ..	3½	3½	3½	4	3½	4
April 27 ..	6½	6½	6	7½	6	7
June 13 ..	9	14	5½	15	15	9½
Sept. 12 ..	39	45	11½	52	52½	44½
Oct. 10 ..	48½	48½	31½	49½	51½	52½
Nov. 11 ..	58	51	38	54½	55	62½
Dec. 12 ..	22	15	13	21	15½	22½
1934.						
Jan. 30 ..	13½	12½	11	15½	10½	14

Korumburra (F. E. Kurrle).

(Hill country—grey loam.)

The autumn growth in this district, though by no means good, was much better than that on other Gippsland hill country. The spring growth, which normally commences late in the season and continues late in the spring, made the usual beginning, but was checked by the absence of rain. The advent of late rains enabled a recovery to be made, and growth was prolonged into the summer.

Rotational Grazing Section.

The autumn dressings of superphosphate, sulphate of ammonia, and potash were applied on 22nd April, and the spring dressings of nitrogen and superphosphate were made on 1st August.

There has been a fair response to superphosphate and lime, but no visible response to potash. Sulphate of ammonia gave some improvement in colour and growth for short periods in late autumn and early spring.

Table VII. shows the amount of grazing obtained from each plot.

TABLE VII.—GRAZING PLOTS, KORUMBURRA.

Grazing Commenced.	"Milking Cow Days" per Plot.			
	Super., 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
Oct. 3 ..	35	28	24	..
Oct. 17 ..	5	3	2	16
Nov. 8 ..	19	9	19	24
Nov. 23 ..	19	14	14	14
Dec. 12 ..	24	19	..	..
1933.				
Jan. 5	15	15	15	20
Mar. 19 ..	16	16	16	16
April 30 ..	16	13	13	11
June 20 ..	18	12	12	6
July 17 ..	9	7	4	4
Aug. 9 ..	9	9	6	2
Aug. 23 ..	3	2	1	1
Aug. 30 ..	7	5	3	1
Sept. 16 ..	8	5	2	..
Oct. 3	9	2	1	1
Nov. 1 ..	31	31	31	31
Dec. 13 ..	12	12	12	12

The manured plots have shown a much better growth than has the unmanured plot. The addition of nitrogen and lime has effected further improvement.

QUANTITATIVE MANURIAL TRIAL.

The autumn dressing of manure was applied on 22nd April, and the spring dressing on 10th August. Table VIII. shows the amount of produce obtained from each plot expressed in hundredweights of greenstuff per acre.

The response to superphosphate has been fair. Sulphate of ammonia gave fair response in autumn and spring, but from the June and September cuts only. Lime has given a further increase in growth, and during the spring of 1933 a small consistent increase due to potash was recorded.

PASTURE MIXTURES AND STRAINS.

Except that the growth ceased earlier than usual, general growth and development on this area have been quite good. Rye-grass and cocksfoot have made the bulk of growth. Clover development has not been vigorous, the subterranean clover particularly making very little growth. Other grasses, prairie, timothy, paspalum, and Phalaris have made poor headway. In the rye-grass strain section the annual ryes have now practically disappeared and weeds have taken their place in these plots. Irish and New Zealand South Island ryes are making rather better growth than on the other Gippsland plots. The persistent perennial types have all made good growth, and have formed satisfactory swards.

Towards the end of the season the area was cut with a meadow hay mower, and the produce removed. A good, fresh green growth followed the late rains, and this plot is now in good order, being fresh and green, and free from weeds.

TABLE VIII.—MANURIAL TRIALS, KORUMBURRA.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 13 ..	6	7½	5½	9	4½	6½
Sept. 20 ..	9½	16	6½	19½	16	9½
Oct. 27 ..	77	80½	66	87½	84	84
Nov. 8 ..	15	16	12	18	18	16
Dec. 9 ..	48	45	39½	52	51	53½
1933.						
Jan. 12 ..	34½	32	29	38	34	40
Mar. 16 ..	4½	5	4	6	4½	5
April 23 ..	4	4	3½	6	4	4½
June 16 ..	6½	12½	4	16½	16	8½
Sept. 6 ..	15½	19	4½	25½	22	17½
Oct. 3 ..	21½	20½	7½	25½	23½	24
Oct. 31 ..	47	39	23	47	44	53
Dec. 11 ..	26½	19½	13½	25	21	29½
1934.						
Jan. 24 ..	10½	10	8½	13½	10½	13

Mirboo North (R. E. Barrand).

(Hill country—red loam.)

The autumn and winter growth of the pasture was very slow, and there was no material growth until well into the spring. The late rains, however, appeared to benefit this district more than most of the other hill

country, and during January the pasture presented a very fresh and green appearance.

Rotational Grazing Section.

The superphosphate, sulphate of ammonia, and potash were applied on 28th April, and the spring dressings of nitrogen and superphosphate on 3rd August. Although there was some response to the autumn dressing of nitrogen, there was a much better response to the early spring dressing, and at the present time the pasture on the paddocks treated with sulphate of ammonia is in much better condition. Table IX. gives the number of days' grazing per acre obtained from each plot.

Table IX.—Grazing Plots, Mirboo North.

Grazing Commenced.	"Milking Cow Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
Sept. 19 ..	27	27	20	14
Oct. 30 ..	31	27	26	18
Dec. 1 ..	28	25	24	21
1933.				
Jan. 2	30	18	17	16
Feb. 3	20	18	17	16
April 12 ..	25	23	22	20
June 2 ..	45	22	14	12
July 10 ..	9	5	..	..
July 28 ..	6	5	10	..
Sept. 18 ..	36	33	16	7
Oct. 9	18	16	8	7
Oct. 21 ..	9	8	8	7
Nov. 10 ..	18	16	15	7
Dec. 2 ..	9	8	8	7
Dec. 13 ..	18	16	15	14

While the response to superphosphate has been fair, the main factor controlling pasture growth appears to be the nitrogen deficiency. The addition of lime results in a further increased growth. As yet there has been no appreciable increase due to potash.

Quantitative Manurial Trial.

The manures were applied at the same time as those on the rotational grazing paddocks. Table X. shows the amount of produce obtained from each plot.

There has been a fair response to superphosphate, while nitrogen and lime have given a further marked increase. During the spring growth a small response to potash also was recorded.

Table X.—Manurial Trials, Mirboo North.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Sept. 19 ..	6	9	4½	10½	10	6
Oct. 25 ..	37	48½	28	51½	51½	37½
Nov. 9 ..	10	14½	12	14	14	14½
Dec. 8 ..	34	32	28	36	32	33½
1933.						
Jan. 11 ..	17½	15½	15	18½	16½	17½
Mar. 14 ..	4	4	4½	5	4	5
April 25 ..	2½	2½	2	3½	2½	2½
June 14 ..	1½	2	1½	2½	2	1½
Sept. 8 ..	6	9½	4	13	11½	7
Oct. 12 ..	24	31½	13½	41	35	27
Nov. 11 ..	19½	19½	17½	20½	19½	20
Dec. 14 ..	12½	13½	12	16	12½	13½
1934.						
Jan. 31 ..	10	10	10	14½	10½	10½

Pasture Mixtures and Strains.

During the past year the general growth on this area was poor, mainly owing to the unfavorable weather conditions combined with the lack of soil fertility. The response to the late rains has been fair, cocksfoot and white clover making most of the growth. Rye-grass made some headway during the season, while the development of other species, such as Phalaris, paspalum, and prairie grass was very poor. Subterranean clover development was very weak also.

In the rye-grass strain section, the perennial types have formed fair swards after a rather slow start, while the annual and false perennial plots now consist mainly of flatweed, plantain and native grasses.

Warragul (*C. Tyssen*).

(*Hill country—red loam.*)

The autumn growth of pasture was very poor, and the district experienced a very short spring. There was not sufficient rain during

the later months to carry the pasture on, with the result that the season ended rather abruptly.

TABLE XI.—GRAZING PLOTS, WARRAGUL.

Grazing Commenced.	"Young Stock Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
Sept. 18 ..	35	35	21	21
Oct. 4	55	55	77	66
Oct. 27 ..	77	66	44	33
Dec. 1 ..	143	132	99	77
1933.				
Jan. 17 ..	65	39	39	..
Mar. 22 ..	24	21	18	12
June 16 ..	56	40	48	32
July 8 ..	48	48	24	16
Sept. 23 ..	126	90	54	36
Nov. 15 ..	75	75	57	57
Nov. 22 ...	91	65	65	39

ROTATIONAL GRAZING PLOTS.

The superphosphate, sulphate of ammonia, and potash dressings were applied to these paddocks on 20th April, 1933, and the spring dressings of nitrogen and superphosphate on 4th August. There has been a good response to superphosphate and a further increase due to sulphate of ammonia. Lime (1 ton per acre) has given and maintained an additional increase in growth. There has been no appreciable response to potash. Table XI. gives the number of days' grazing obtained from each plot.

The most grazing has been obtained from the limed plot closely followed in turn by the superphosphate and sulphate of ammonia plot and the "superphosphate only" plot. The "no manure" paddock has become much more weedy and backward than the treated plots.

QUANTITATIVE MANURIAL TRIAL.

The manures were applied to this section at the same times as those on the rotational grazing area. Table XII. shows the amount of produce obtained from each plot expressed as hundredweights of greenstuff per acre.

There was a good autumn and early spring response to sulphate of ammonia, with lime giving a further increase, which has been maintained through the season. The main factor controlling pasture growth on this area appears to be the deficiency of soil nitrogen during the winter months.

TABLE XII.—MANURIAL TRIALS, WARRAGUL.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Sept. 17 ..	3½	6½	2½	6½	5½	3½
Oct. 18 ..	20	27½	18½	34	29	20½
Nov. 10 ..	19½	21	18	27	21½	20½
Dec. 13 ..	39	35	34	49	38	42½
1933.						
Jan. 10 ..	7½	7	8	9½	8½	9
Mar. 13 ..	4	4	4	5	4	4½
April 20 ..	2½	2½	2½	3½	2½	3
June 13 ..	2	3½	1½	4	4	3
Sept. 12 ..	3½	8½	2½	12½	10½	2
Oct. 11 ..	14	22½	12	29	24½	14½
Nov. 13 ..	19	21	16½	24	21½	20½
Dec. 18 ..	6	5½	5½	6½	5½	6
1934.						
Jan. 31 ..	4½	4	4½	5	4½	4½

PASTURE MIXTURES AND STRAINS.

As a result of unfavorable weather conditions encountered throughout the season and low soil fertility, the general growth on this area has not been vigorous. Rye and cocksfoot have made the bulk of growth. Phalaris has made fair development on this plot. Red clover made satisfactory headway, but the general clover growth has been disappointing. White clover has done well in patches, but mainly in the rye-grass strain section where the annual rye types have failed. Subterranean clover was checked by the dry weather conditions during last autumn, and later did not make satisfactory progress.

In the rye-grass strain section the plots sown to the short-lived types—Italian, Wimmera, New Zealand South Island, and Irish ryes—have now become very weedy, and few rye plants remain. The perennial types—New Zealand certified, Western District, Central Victorian, and Gippsland rye—though not making vigorous growth, have made fair establishment. Cocksfoot is the only species making any growth at the present time. The area was mown late in November.

Typical Western District dairy herd.

WESTERN DISTRICT.

Cudgee (E. R. Murfitt).

(*Sandy loam.*)

Late autumn and early spring growth was good, and was followed by a very heavy growth during September and early October. Dry conditions subsequently checked the growth late in the spring, and it did not recover with the late rains.

Rotational Grazing Plots.

Autumn dressings of superphosphate, sulphate of ammonia and potash were applied to all plots on 28th April. The spring applications of superphosphate and sulphate of ammonia were made on 2nd August.

These plots have shown a very striking response throughout the year to the use of superphosphate, which has resulted in much more vigorous growth than on the untreated plot. After the autumn and spring applications of sulphate of ammonia the response, indicated by growth, colour, and additional grazing, was very good. This increase was not sustained after mid-September. A slight response has been obtained from the use of lime, but no improvement has been seen from the application of potash.

Table XIII.—Grazing Plots, Cudgee.

Grazing Commenced.	"Young Stock Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
July 30 ..	52	52	52	32
Aug. 27 ..	36	36	27	18
Sept. 16 ..	64	48	64	32
Oct. 17 ..	45	60	45	30
Nov. 11 ..	48	36	36	24
Dec. 15 ..	32	32	28	15
1933.				
Mar. 13 ..	50	50	50	30
April 10 ..	70	70	56	42
May 21 ..	40	40	32	24
June 26 ..	65	65	52	39
July 22 ..	60	48	36	24
Aug. 16 ..	90	80	50	27
Sept. 28 ..	40	40	30	20
Oct. 28 ..	40	40	40	28
Dec. 24 ..	70	70	70	70

These grazing plots have been fed off with young stock usually when the grass was about 4 inches high. The number of days grazing obtained from each plot is shown in Table XIII. *As indicated previously, the value of these figures as an indication of the yield of each plot is discounted owing to the fact that the amount of grass eaten per day varies from plot to plot according to the palatability of the feed.*

Quantitative Manurial Trial.

Since the autumn dressing of manures, six cuttings have been made. These plots have shown a very marked response to superphosphate throughout the season. In the early spring the response to sulphate of ammonia was good, but was not sustained. Lime has given no improvement, but the potash plot gave some response in the spring. Table XIV. shows the amount of produce obtained from each plot expressed as hundredweights of greenstuff per acre.

Table XIV.—Manurial Trials, Cudgee.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 10 ..	11½	13	7½	8½	10	10
Sept. 7 ..	30½	35	14½	28	28	33
Oct. 3 ..	44½	49	26	44	50½	47½
Oct. 25 ..	23	23	14	22	25½	26
Nov. 17 ..	17½	14	12½	12½	14½	16
Dec. 17 ..	3½	3½	3	3½	3½	3½
1933.						
April 28 ..	3	4	2½	4	3½	3
June 15 ..	14	20	5½	20½	22	15
Sept. 13 ..	46½	53	18	52½	67½	48½
Oct. 11 ..	65½	60½	55	61	70	68½
Nov. 10 ..	7½	7	6½	7	6½	7
1934.						
Jan. 16 ..	1½	1½	1	1½	1	1½

Pasture Mixtures and Strains.

On the pasture mixture section excellent swards have been developed by rye-grass, cocksfoot, and subterranean clover. Phalaris has not made much headway, and the prairie grass, after growing well in the first year, is now present in small amounts only. Good growth has been made by subterranean, red, and alsike clovers, the white clover making fair development only. Lucerne, strawberry clover, and Lotus hispidus have failed to develop as has also the meadow foxtail, Kentucky blue, timothy, and paspalum. Good growth has been made by brown top, Chewing's fescue, and crested dogstail.

In the rye-grass strain section excellent swards have been developed by the persistent strains—New Zealand certified, Western District, Central Victorian, and Gippsland. Irish rye-grass affords a thin stand only, many of the plants having failed to recover after the first season's growth. Secondary or seedling growth on the Wimmera, Italian, and New Zealand South Island (uncertified) is very slight, and plots sown to these strains are now thin, and compare very unfavorably with the persistent types.

Cobrico (Maskell Bros.).

(Light silt and buckshot loam.)

Except for a few weeks in mid-spring, the seasonal conditions during 1933 were unfavorable for pasture growth. Dry autumn and winter conditions retarded growth, but in the early spring heavy rains gave rise to an abundance of feed. Since then drier conditions have prevailed, and are reflected in the results. The area did not recover well after the late spring rains.

Rotational Grazing Plots.

On the 29th of April the autumn application of superphosphate, sulphate of ammonia, and potash was made. The spring dressings of sulphate of ammonia and superphosphate were applied on the 3rd of August, 1933, to all plots.

The response given by superphosphate during this season was slightly more marked than in the previous year. Sulphate of ammonia gave a good increase over superphosphate plots. The potash strips have shown no apparent improvement, although a good increase has been recorded on the mowing plots.

These grazing plots have been fed off from time to time usually with dry or young stock. Table XV. shows the amount of grazing obtained from each plot.

In the first year of operations accumulated residues of superphosphate, due to continued dressings over a number of years, tended to

mask any response from this manure. This year greater responses have been obtained. Sulphate of ammonia also gave good responses during this past season.

TABLE XV.—GRAZING PLOTS, COBRICO.

Grazing Commenced.	"Heifer Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
July 30 ..	22	22	22	22
Sept. 9 ..	42	40	30	30
Oct. 7	54	45	45	48
Nov. 9 ..	49	63	63	49
Dec. 11 ..	42	28	42	42
1933.				
June 29 ..	77	63	42	28
July 28 ..	33	17	..	..
Sept. 15 ..	45	45	42	28
Oct. 7	45	30	22	22
Oct. 26 ..	36	27	27	18
Dec. 6 ..	28	28	21	21

QUANTITATIVE MANURIAL TRIAL.

Manures were applied to these plots at the same time as those in the rotational grazing areas. Since then six cuttings have been made. While the "no manure" plots generally have shown poorer growth than those receiving superphosphate, the outstanding feature of this trial has been the excellent response to potash. The use of sulphate of ammonia gave a marked increase in the winter and spring cuttings, but the effect was not sustained after the second spring cutting. Table XVI. shows the amount of produce obtained from each plot expressed in hundredweights of greenstuff per acre.

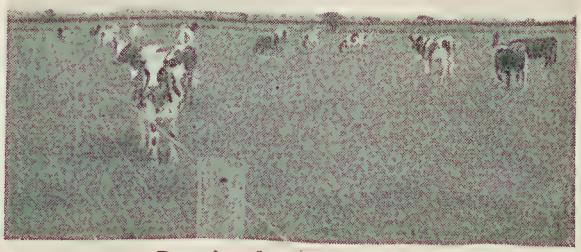
PASTURE MIXTURES AND STRAINS.

In the pasture mixtures area which was top-dressed with superphosphate on the 29th of April at the rate of 1 cwt. per acre the bulk of the growth this season has been made by the rye-grass and white and subterranean clovers. Cocksfoot has developed well, and now contributes appreciably to the swards in which it was included. Phalaris tuberosa also has established well, and is making some headway. The prairie grass failed to "carry over" into the second year. Chewing's fescue and brown top are present in small amount, but other grasses, such as timothy, meadow, foxtail, paspalum, and crested dogstail, have failed to develop. Of the clovers, best growth has been made by subterranean and White Dutch. Some growth was made by alsike and red, but the strawberry, lucerne, and Lotus have failed.

On the rye-grass strain section the New Zealand certified, Central Victorian, Western District, and Gippsland strains have persisted, and are developing good swards. The Italian, Wimmera, and New Zealand South Island (uncertified) strains failed to recover in the second season. Volunteer white clover, Yorkshire fog, and sweet vernal grass are now very conspicuous on these plots. The stand of Irish rye-grass is rather thin, the plants being small and less vigorous than the more persistent types of rye-grass.

TABLE XVI.—MANURIAL TRIALS, COBRICO.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 8 ..	19	17½	18½	18	18	18½
Sept. 8 ..	16	16½	12½	18½	18	12
Oct. 5 ..	45	40½	30½	41½	56	37
Oct. 26 ..	37½	36	32	34½	43	34½
Nov. 17 ..	22	20½	18	18½	27½	20
Dec. 16 ..	24½	24	21½	26½	30½	33
1933.						
April 29 ..	14	13½	11½	18½	13	15
June 15 ..	14	21	8	22	29	14½
Sept. 13 ..	19½	31	11	30	44	19
Oct. 12 ..	41	51	35	43½	65½	41
Nov. 10 ..	14	14	11½	14½	18	14½
Dec. 17 ..	5½	5	4½	5	5	6½



Rotational Grazing Tests.

Coragulac (E. W. Martin).

(Rich volcanic loam.)

Owing to the comparatively light seasonal rainfall the growth in the autumn and winter was poor. In the early spring bountiful rains gave rise to good growth, which continued until mid-October. Dry conditions checked the growth on the plots during the late spring, and it did not recover after the early summer rains.

Rotational Grazing Plots.

The autumn application of superphosphate, sulphate of ammonia, and potash was made on the 22nd April, 1933. The spring dressings of sulphate of ammonia and superphosphate were applied on the 8th August, 1933.

The increased growth and generally better appearance due to the application of sulphate of ammonia has been marked. The plot receiving lime in addition has appeared to rather better advantage than that receiving superphosphate and sulphate of ammonia only. The response to "superphosphate only," as against "no manure" was not marked, except for a short period in the spring, when this plot appeared to show some improvement. No improvement, due to potash, could be seen during any period of the year. Table XVII. shows the amount of grazing obtained from each plot.

Table XVII.—Grazing Plots, Coragulac.

Grazing Commenced.	"Milking Cow Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
July 27 ..	30	24	24	24
Sept. 4 ..	44	44	44	44
Oct. 1 ..	44	44	44	44
Nov. 1 ..	48	48	48	48
Nov. 17 ..	36	36	36	36
Dec. 14 ..	36	36	24	24
1933.				
July 15 ..	42	48	36	36
Sept. 15 ..	52	52	42	42
Oct. 6 ..	50	50	30	8
Nov. 2 ..	26	26	25	24
Dec. 15 ..	22	22	22	22

Owing to the poor seasonal conditions, the amount of grazing received from the plot has not been great. The response to the use of sulphate of ammonia and sulphate of ammonia + lime was marked during the early spring.

Table XVIII.—Manurial Trials, Coragulac.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 5 ..	6	6	6	7½	6	5½
Sept. 10 ..	7½	15	9	24	23	8
Sept. 29 ..	15½	19½	12	20½	20½	16½
Oct. 24 ..	52	50	41	49	51½	55½
Nov. 15 ..	30½	42½	38	32½	38	46
Dec. 14 ..	12	13	13½	13	13	13
1933.						
April 21 ..	2	2½	2½	3	2	2
June 19 ..	6	10½	5½	11	10½	6
Sept. 11 ..	Weights from 15–22 cwt. per acre, according to soil variations. S. of A. plots, 25–30 per cent. above super. (Estimate only—figures lost).					
Oct. 9 ..	91½	90	62½	88½	91½	105½
Nov. 8 ..	9½	10	10½	9½	9½	8
Dec. 22 ..	8	8	8	8	7½	8

Quantitative Manurial Trial.

Since the autumn application of manures on the 21st April, 1933, six cuttings have been made. The spring dressings of sulphate of ammonia and superphosphate were applied on the 8th August, 1933. Table XVIII. shows the amount of produce obtained from each plot expressed as hundredweights of green grass per acre. The weights reveal a response to the autumn and spring applications of sulphate of ammonia. This increase became less obvious as the season advanced, and, from October, all plots were cutting practically the same amount of greenstuff.

Pasture Mixtures and Strains.

This field was top-dressed on 21st April, 1933, with superphosphate at the rate of 1 cwt. per acre. Growth throughout the early part of the spring was good. Later the dry spring season retarded growth of the species sown in the pasture mixtures.

The outstanding swards are those composed of rye-grass, together with cocksfoot, Phalaris, or subterranean clover. With prairie grass the secondary growth from old plants has been good. Some seedling growth has taken place during this second year.

There was no appreciable establishment of any of the clovers other than subterranean which, owing to the unfavorable seasonal conditions, did not develop as heavy a growth as during the previous year. The grasses such as timothy, crested dogstail, and meadow foxtail, have failed to establish.

In the rye-grass strain trial section, the perennial strains have made good headway. Those which have persisted and given the best swards are the New Zealand certified, Western District, Central Victoria, and Gippsland. Irish rye-grass has made only weak growth throughout the season, and is patchy in the ground cover it affords. The second-year growth from Italian rye-grass was poor. The Wimmera and New Zealand South Island strains failed to carry on into the second year, and except for a very slight seedling growth in each case, the bulk of growth on these plots consists of weeds.

Larpent (A. S. Gladman).

(Strong sandy loam.)

Except for good early spring rains, which produced an abundance of growth in the early spring, comparatively dry conditions have prevailed. This is reflected in the results obtained from the plots.

TABLE XIX.—GRAZING PLOTS, LARPENT.

Grazing Commenced.	"Milking Cow Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1933.				
April 21 ..	8	8	8	2
May 19 ..	10	10	7	2
July 24 ..	9	9	6	3
Aug. 15 ..	9	9	6	3
Oct. 9	19	25	15	9
Nov. 4 ..	34	34	34	34
Nov. 22 ..	34	34	34	34
Nov. 30 ..	15	15	15	15
1934.				
Jan. 10 ..	17	17	18	17
Jan. 11 ..	10	10	12	10

ROTATIONAL GRAZING PLOTS.

The autumn application of superphosphate, sulphate of ammonia, and potash was made on 20th April, 1933. The spring dressings of sulphate of ammonia and superphosphate were applied on the 7th August, 1933.

The increased growth and better appearance on the treated plots were very marked during the winter months. The spring application of sulphate of ammonia gave a very good increase early in the spring, but since then the differences have not been obvious.

The amount of grazing obtained from each plot is shown in Table XIX.

The response to the use of superphosphate was marked during the winter and early spring. Subsequently the extra grazing on this plot was not very noticeable. In the late winter and early spring the application of sulphate of ammonia produced additional feed. The effect of lime has not been marked. At no time was there any difference in density or colour of the herbage due to the use of potash. On the mowing section, however, a marked response to the potash dressing was obtained.

TABLE XX.—MANURIAL TRIALS, LARPENT.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre.					
	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 5 ..	8½	8½	6	8	9	9
Sept. 6 ..	20	25½	7½	25½	29½	23
Oct. 6 ..	44	50	20½	53	58½	48
Oct. 27 ..	25	25½	17	25	26½	26
Nov. 18 ..	43½	40	32½	44	50½	46½
Dec. 14 ..	19½	19	15	21	20	21½
1933.						
April 20 ..	3	3	2½	3½	3	3½
June 19 ..	12	16½	3½	17	18	12
Sept. 12 ..	23½	36½	5	43½	55	23½
Oct. 10 ..	59	64½	36½	67	70	60
Nov. 9 ..	27½	24½	29	23½	27	27½
Dec. 22 ..	18½	17	11½	17	16	20

QUANTITATIVE MANURIAL TRIALS.

Six cuttings have been made since the autumn application of manures on 20th April, 1933. The spring dressings of sulphate of ammonia and superphosphate were applied on 7th August.

The weights obtained from the cuttings (see Table XX.) reveal a very marked in-

crease due to the application of superphosphate. Sulphate of ammonia, lime, and potash, in conjunction with superphosphate, have further increased the amount of greenstuff obtained. As a result of the dry weather, the November cut showed a depression on all the treated strips. In December, following on the heavy late rains, the advantage of the manures was again apparent.

Pasture Mixtures and Strains.

In the late spring of 1932 this field yielded a very heavy cut of meadow hay, but dry, hot weather followed, and the effect on the pasture was very severe, and most of the plants died. In the absence of early rains the full extent of the damage was not apparent until the late autumn, when it was found that the field would have to be resown. It is intended that this shall be done early next autumn (1934).

The best growth on this field has been made by rye-grass, cocksfoot, and Phalaris, all other species having been choked out. On the strain trial section, a few scattered plants of the perennial types have persisted. The Italian, Wimmera, and New Zealand South Island Island varieties died out completely; their place being taken by weeds such as capeweed, sorrel, and sedges.

The experience with this field shows that even the most persistent types of rye-grass will fail to establish satisfactory swards unless they are properly managed during the first season.

Glenormiston North (Messrs. K. Atkins and A. S. Noel).

(Strong sandy loam.)

Dry conditions caused a poor autumn and winter development which was followed by a very heavy growth during late September and early October. Later, the dry conditions which then prevailed tended to check the growth. Summer rains produced a green shoot in early January. Since then the pastures have been backward.

Rotational Grazing Plots.

The plots have shown a fair response to the use of superphosphate, particularly during the winter and early spring months. Plots which received the additional dressings of sulphate of ammonia have shown a better growth in the early spring. Little improvement has been observed as a result of the use of lime. Potash has shown no improvement. Table XXI. shows the amount of grazing obtained from each plot.

Rotational Grazing Trials.

Quantitative Manurial Trials.

Manures were applied to these plots on 1st May, 1933 (autumn dressing), and on 8th August (spring applications of sulphate of ammonia). Since then six cuts have been made.

Table XXI.—Grazing Plots, Glenormiston North.

Grazing Commenced.	"Milking Cow Days" per Plot.			
	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt.	Super. 2 cwt.	No Manure.
1932.				
July 30 ..	16	16	16	16
Sept. 7 ..	36	36	30	30
Sept. 30 ..	54	45	34	24
Oct. 27 ..	64	53	56	61
Nov. 22 ..	65	65	81	50
Dec. 27 ..	64	45	54	45
1933.				
April 4 ..	16	16	16	8
July 12 ..	24	24	24	18
Aug. 11 ..	24	24	18	..
Sept. 7 ..	48	48	36	36
Sept. 21 ..	24	18	18	12
Oct. 8	48	48	48	32
Oct. 19 ..	24	24	24	16
Nov. 7 ..	39	39	26	26
Dec. 1 ..	19	13	13	13
Dec. 26 ..	12	12	12	12

A fair response to the use of superphosphate has been recorded, while those plots receiving the additional dressing of sulphate of ammonia have given a further increase in yield in the

early spring. This increase, however, was not sustained for long into the spring. Little or no benefit has been derived from either lime or potash.

Table XXII. shows the amount of produce obtained from each plot expressed as hundredweights of greenstuff per acre.

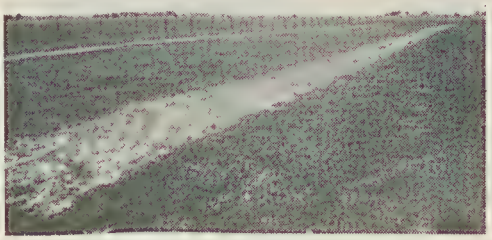
TABLE XXII.—MANURIAL TRIALS, GLENORMISTON NORTH.

Date of Cutting.	Yields in cwt. of Greenstuff per Acre. Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
1932.						
Aug. 9 ..	18	17	18	19½	15½	16
Sept. 8 ..	22½	27	21½	30	26	21
Oct. 1 ..	41	49	38½	53½	48	47
Oct. 25 ..	41	38½	35	39½	38½	40
Nov. 16 ..	35	28	29	29½	32	34½
Dec. 17 ..	18	17½	16	16	17	19
1933.						
May 1 ..	5½	6	4½	6	6	6
June 14 ..	6	9	4½	9½	8	6½
Sept. 12 ..	27	34	19	34	34	27
Oct. 11 ..	77	73½	68	75½	76½	74
Nov. 9 ..	16	13	15½	13½	14	16½
1934.						
Jan. 17 ..	3½	3½	3½	4½	4	4

PASTURE MIXTURES AND STRAINS.

This area was top-dressed with 1 cwt. of superphosphate on 1st May, 1933. The autumn growth was poor, but its development since then has been satisfactory. Excellent cover has been afforded by the rye-grass, cocksfoot, and subterranean and white clovers. Phalaris tuberosa growth has been sparse, and prairie grass has given only very slight grazing during this second year. Fair development has been made by crested dogstail, brown top, and Chewing's fescue. Paspalum, timothy, Kentucky blue, and medow foxtail have failed to make satisfactory development.

Of the clovers, best growth has been made by subterranean, white, and alsike. Very weak development was made by lucerne, red strawberry, and Lotus. In the rye-grass section New Zealand certified, Western District, Central Victorian, and Gippsland have persisted and developed good swards. The Irish rye-grass is thin and weak, although some plants are surviving. Except for a little seedling growth, Wimmera, Italian, and New Zealand South Island (uncertified) ryes have failed to develop in the second year. Weeds such as capeweed, fog, and flat weeds have intruded on portions of this plot.



Limed plots at Glenormiston North.

TABLE XXIII.—ESTIMATION OF PERCENTAGE OF CLOVER PRESENT ON MAJOR PLOTS (MOWING SECTIONS) FOR LATE AUTUMN AND MID-SPRING GROWTH, 1933.

Gippsland.	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt., S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
Caldermeade—						
Autumn ..	34·0	28·0	19·5	31·0	36·0	33·5
Spring ..	55·0	33·5	41·0	32·5	35·0	53·0
Korumburra—						
Autumn ..	28·0	18·0	12·0	18·0	17·0	28·0
Spring ..	56·0	31·0	18·0	30·5	33·5	54·0
Toora—						
Autumn ..	35·0	26·0	38·0	33·5	29·0	38·0
Spring ..	65·5	46·0	63·0	58·0	52·5	63·0
Yarragon—						
Autumn ..	44·0	26·0	20·0	41·5	40·5	44·0
Spring ..	63·0	44·0	38·0	47·5	46·0	62·0
Warragul—						
Autumn ..	12·5	7·0	12·0	16·0	8·0	16·5
Spring ..	15·0	9·0	15·0	22·0	8·0	15·0
Mirboo Nth.—						
Autumn ..	13·5	5·0	6·0	15·5	6·0	7·0
Spring ..	24·0	17·5	20·5	41·0	16·5	19·5

Tables XXIII. and XXIV. show the percentage of clover appearing in mown sections of the manurial trials in Gippsland and the Western District. Plots treated with sulphate of ammonia show a reduced proportion of clover and an increased percentage of grasses as compared with those receiving superphosphate only. Where ammonium sulphate and potash have been used together the effect of the potash apparently has been to maintain the proportion of clovers.

On some trials increased growth on the "super." plots was due to the extra growth of grasses only. Owing to the dry autumn the clover made a late start, and could not compete with the vigorous grass growth. On the unmanured plots, however, the winter grass growth was not vigorous, and this enabled the clover to establish and develop unchecked. This resulted in the anomaly of the "no manure" plots containing a greater percentage of clovers than the "supered" areas.

TABLE XXIV.—ESTIMATION OF PERCENTAGE OF CLOVER PRESENT ON MAJOR PLOTS (MOWING SECTIONS) FOR LATE AUTUMN AND MID-SPRING GROWTH.

Western District.	Super. 2 cwt.	Super. 2 cwt., S. of A. 2 cwt.	No Manure.	Super. 2 cwt., S. of A. 2 cwt., Lime 1 ton.	Super. 2 cwt. S. of A. 2 cwt., Potash 1 cwt.	Super. 3 cwt.
Larpent—						
Autumn ..	10·5	11·0	24·0	7·0	9·0	18·0
Spring ..	17·0	13·0	44·0	8·0	9·0	13·0
Coragulac—						
Autumn ..	12·0	7·0	9·0	11·0	7·0	16·0
Spring ..	71·0	61·0	65·0	51·0	50·0	69·5
Cobrico—						
Autumn ..	35·5	32·0	40·0	19·0	43·0	27·0
Spring ..	21·0	22·0	36·0	12·0	48·0	17·5
Cudgee—						
Autumn ..	39·0	29·0	35·0	31·0	35·0	25·0
Spring ..	51·0	30·5	58·0	29·0	44·0	40·0
Glenormiston—						
Autumn ...	5·0	7·0	8·0	9·0	7·0	4·5
Spring ..	2·5	1·0	4·0	1·0	2·0	3·0

PILOT PLOTS, GIPPSLAND.

In addition to the 11 "major" plots, 35 "pilot" or demonstration plots have been established at other centres in Gippsland and the Western District. A report of the observations made on these plots during the past year is appended.

Callignee (H. E. Sutton and Son).

The soil here consists of rather fertile red hill country, which naturally grows a good pasture of cocksfoot, a little rye, annual clovers, and native grasses, together with some flat weed and plantain. A great deal of improvement already has been brought about in this country, either by cultivation and the sowing of pasture mixtures (mainly cocksfoot and subterranean clover) together with top-dressing, or by top-dressing with superphosphate only. The conditions for pasture growth in this area are better than most of the red hill country of Gippsland. Winter growth is generally slow, and the pastures mature late in the spring.

In the manurial tests there has been a good response to superphosphate. Sulphate of ammonia gave a fair increase during the late autumn with a slightly better response in the early spring. Lime has been responsible for a slight improvement, but potash has not given any response.

The area sown to the various species has become very well grassed. Cocksfoot and subterranean clover have been particularly vigorous, but rye-grass and white clover also have made good progress. Red and alsike clover are well established. Prairie grass, Phalaris, and paspalum have made little headway. Lucerne is growing well in patches. Capeweed, scarlet pimpernel, and sorrel were present, but were not so troublesome this season as last, the general vigour of the pasture growth having kept the weeds in check.

The manurial responses at Callignee have been very marked. The area is now well grassed, and carries a vigorous pasture mixture. Subterranean clover made much better growth on these plots during the season under review than in most other districts.

Dumbalk North (Hamilton Bros.),

The plots at Dumbalk North are located on a steep hillside. The soil, a good, grey loam,

is capable of carrying a vigorous mixed pasture of cocksfoot, rye-grass, white, red, and subterranean clovers. Winter growth generally is good, the pasture maturing late in the spring.

Very good response to superphosphate has been shown, while sulphate of ammonia gave a marked response during the early spring only. There has been no response to lime or potash. On the "sown mixtures section" cocksfoot forms the bulk of growth with rye-grass, white and subterranean clovers growing strongly. Phalaris and prairie grass have grown better than in most districts. Red and alsike clovers also have made good headway. Lucerne has not maintained its early development. Chewing's fescue and brown top have become well established on this area, which has always been comparatively free from weeds.

Cocksfoot with rye-grass, white and subterranean clovers has formed a dense sward. Despite the unfavorable weather conditions, the Dumbalk North plots have made excellent growth throughout the year.

Foster (J. Hunter).

The Foster plots are located on land which only recently has been cleared of scrub, and is carrying a pasture mainly of Yorkshire fog, sweet vernal, sedges, white clover, and annual trefoils. The soil is a white silt of low fertility, poorly drained, and very cold during the winter. A fair response to superphosphate and a marked increase in growth and colour, due to sulphate of ammonia, have been recorded, but the latter was of short duration. Lime has given a small increase, but there has been no response to potash.

During the autumn growth on the "sown species" area consisted mainly of white clover with a variety of weeds. Later, other species began to show up, and during the spring rye-grass and the Lotus species were making some headway. Red and alsike clovers have made good growth, while cocksfoot, Phalaris, and prairie grass have made very weak development.

Weeds present consist mainly of Yorkshire fog, sorrel, plantain, flatweed, and juncus, together with volunteer white clover.

On the plots as a whole rye-grass, white clover, and the Lotus species came away late in the spring, and fair growth was experienced until December. The area is ill-drained, and this, together with the low soil fertility, has retarded pasture establishment.

Leongatha (R. Stockdale).

The soil here is a deep red fertile loam extensively used for cultivation as well as for pasture purposes. Except where mixtures have been sown down this soil naturally carries a rather poor type of pasture, which generally has developed as a result of cropping paddocks being allowed to go out to grass. Treated in this way, the volunteer pasture is mainly Yorkshire fog, cocksfoot, native grasses, trefoils, flatweed, and plantain.

On the manurial plots superphosphate has effected a marked improvement both in pasture growth and establishment, while sulphate of ammonia brought about a considerable increase in produce and improvement in colour. There has been no response to lime or potash.

The bulk of growth of the sown species has been made by cocksfoot, although rye-grass and subterranean clover made satisfactory growth during the spring. Red and alsike clovers are growing strongly. Other species such as Phalaris, prairie grass, and paspalum have made very poor growth. Lucerne has made only fair development. Weeds consist mainly of flatweed, plantain, and sorrel, but have not caused much trouble this season.

Strong pasture growth has been recorded on these plots, particularly during the flush period of the spring. Owing to the heavy bulk of growth and the loose soil the pastures dry off and mature rather early. Superphosphate is essential for satisfactory pasture establishment and growth.

Longwarry (V. de Lacy Evans).

The dark silt loam on which the Longwarry plots are situated carries a vigorous pasture of rye and subterranean clover which usually responds well to top-dressing.

On the plots the response to superphosphate has not been very great, as the area had previously been top-dressed heavily. Sulphate of ammonia gave a small increase in growth and improvement in colour during the early spring. There has been no response to either lime or potash.

On the "sown species" plots weed growth interfered with the development of the pasture in the early stages. Later, white clover, mainly volunteer, became vigorous, and now constitutes the bulk of growth. During the last winter rye-grass made better headway, and cocksfoot appeared during this time. Other species such as Phalaris, paspalum, and prairie

grass have made little or no growth. Red and alsike clovers have become satisfactorily established.

Flatweed, plantain, sorrel, loosestrife, Poa annua, and chickweed are present, or appear from time to time on this area, and these, together with white and subterranean clovers, have taken possession of the single species trial area.

During the last season the effect of the superphosphate was rather more noticeable, probably as a result of the residual effect of the early dressings becoming exhausted. The pasture on the sown-down area is improving, and now consists mainly of white clover and perennial rye. Winter growth is fair only, the pasture maturing late in spring.

Moe (B. Savige).

The soil at Moe is a poor white silt carrying mainly Yorkshire fog with annual grasses and clovers and a variety of weeds. This land is capable of great improvement by means of top-dressing and the introduction of better species.

The response to superphosphate has been fair, but sulphate of ammonia has had a less marked effect. Lime and potash have given no apparent increase in growth.

Rye-grass, cocksfoot, and brown top have made good headway on the sown section. Red, white, and alsike clovers have become well established, but the subterranean clover growth during the past season has been disappointing. Phalaris and prairie grass have not made satisfactory growth. A small amount of paspalum has become established on these plots. From time to time there has been a strong growth of sorrel, briza, Yorkshire fog, flatweed, and capeweed on this area.

Response to top-dressing on the native growth is not marked. While the pasture mixtures have been subjected to severe competition from weed growth and to low soil fertility conditions, the results so far indicate the possibility of establishing and maintaining very much improved pastures on this light class of country.

Morwell (A. W. Ronald).

A grey clay loam of medium fertility capable of carrying a good mixed pasture, this land is typical of a large tract of country east of Morwell, which at present is cleared, but unimproved.

In these tests superphosphate has given a fair response, while sulphate of ammonia gave a marked increase in the spring. There has been no apparent increase due to lime or potash.

Rye-grass and cocksfoot form the bulk of growth on the sown section, while the general clover development has been poor, particularly in the case of subterranean and white clovers. Late in the season red and alsike clovers made fair growth. Phalaris and prairie grass have made very poor headway, while paspalum has not appeared at all. Chewing's fescue and brown top are rather well established.

The only weeds appearing on this plot are capeweed, sorrel, and scarlet pimpernel, and these have not caused any trouble.

The very dry conditions prevailing during the past season have somewhat checked the development of this pasture, and on those occasions when the plot was grazed down the recovery was slow.

Nar Nar Goon (J. Dore).

A poorly drained heavy loam which has been extensively used for oat cropping, this area is typical of much of the low-lying country between Pakenham and Garfield, most of which is carrying a poor type of pasture only.

On the manurial plots there has been a marked increase due to superphosphate and sulphate of ammonia. The development of grass and clover as a result of these two treatments has been very marked. Lime has given a small increase, but there has been no response to potash.

Weed growth and very cold weather during the winter prevented the pasture from making much headway. White clover (a good deal of which is volunteer) persisted, however, and has made vigorous growth. Red and alsike clovers also did well later in the season. Rye-grass has made fair growth, but cocksfoot is backward. Other species such as Phalaris, prairie grass, and paspalum have made no progress.

Yorkshire fog, plantain, flatweed, sorrel, and loosestrife were troublesome during the early spring, but later the pasture was able to compete fairly successfully against them.

There is a striking contrast in vigour between the manured and unmanured plots. Following on the cold conditions experienced on this country the pasture made good recovery in the spring, and is now well grassed with rye and white clover.

Narracan East (F. Savige).

These plots are on a deep-brown loam of good fertility naturally-growing rye-grass, cocksfoot, annual grasses, and trefoil, together with flatweed and plantain. Winter growth in the district usually is slow, and pastures mature late in the spring.

There has been a small response only to superphosphate and to sulphate of ammonia, while neither lime nor potash have brought about any increase in growth. On the sown section the development of rye-grass as compared with cocksfoot is of interest. Perennial rye has become very well established and strong, whereas cocksfoot has not done at all well. Clovers generally have made poor growth, particularly white and alsike. Subterranean clover made little headway during the spring. Red clover on the other hand has made good progress. Prairie grass has done rather better than on most plots, but other species such as Phalaris, paspalum, lucerne, &c., have not made any headway.

Although the pasture has become well established, weeds consisting mainly of thistles, blackberries, flatweed, plantain, sorrel, and chickweed, have always given some trouble.

On these plots the response to manures has not been very marked. The sown section has made good headway, and although clover development is not strong, there is at present a good sole of grass.

Neerim South (O. G. Lacey).

The soil here is good grey hill country capable of carrying a pasture of cocksfoot, rye-grass, subterranean, and white clovers. The winter growth is slow, and pastures mature late in spring.

There was a small response only to superphosphate, but sulphate of ammonia gave a fair increase over a short period. There has been no response to lime or potash.

Germination on the sown section was poor, and subsequent development very slow, with the result that the area is still poorly grassed. Cocksfoot and a little rye-grass are making the most growth of the sown species. Clover development has been poor, and other grasses such as prairie grass, Phalaris, and paspalum have not developed.

Because of the poor germination weed growth has been very prominent. This consists mainly of Yorkshire fog, plantain, flatweed, dock, buttercup, loosestrife, scarlet pimpernel, and sorrel.

The sown-down section is characterized by the absence of vigour, and the manurial section is rather too weedy to show a satisfactory response to manures.

Nilma North (Swan Bros.).

On the medium brown loam, carrying mainly cocksfoot, Yorkshire fog, rye-grass, native grasses, and trefoils, winter growth is slow, the pasture maturing late in spring.

There has been a fair response to superphosphate and sulphate of ammonia during the past season. Lime and potash have not effected any improvement. The bulk of growth on the sown section is being made by cocksfoot and rye. White, red, and alsike clovers have not made much headway. Subterranean clover is fairly well established. Phalaris, prairie, paspalum, and lucerne have not made any progress. Weeds consist mainly of flatweed, plantain, sorrel, and chickweed, but there is not sufficient weed growth to interfere with pasture development.

The response to manurial treatment has not been marked. The improved growth on the sown-down section indicates the benefits to be derived from the introduction of better grasses and subterranean clover to this class of country.

Pakenham (J. J. Ahern).

The land here, a gritty silt loam on rising ground and of moderate fertility, is used largely for fruit-growing, but much of it is under pasture.

On the manurial plots superphosphate and sulphate of ammonia have both given marked increases in growth, but neither lime nor potash have given any material response.

Cocksfoot and rye-grass are making the bulk of the growth on the sown section. Red and white clovers have made good headway, but subterranean clover development has been fair only. Other pasture and clover species have not made satisfactory progress. Weeds consisting mainly of briza, chickweed, sorrel, flatweed, plantain, and scarlet pimpernel are present in small amount.

There has been marked improvement on the top-dressed areas. The cocksfoot and rye-grass development has been satisfactory, but subterranean clover, which usually does well in this class of country, did not make satisfactory progress on the plots during the past season.

Rokeby (W. and A. W. Aitken).

The soil here is a brown clay loam carrying a weak pasture of cocksfoot, rye-grass, annual grasses, and trefoils.

In these tests there has been a fair increase due to superphosphate and sulphate of ammonia. A small increase from lime has been recorded, but there has been no response to potash. On the sown section, although the pasture has not been vigorous, fair swards were developed on most plots. Cocksfoot is making the bulk of growth, and the sward is a close one for this grass. White, subterranean, and red clovers have made good headway, and have contributed towards a satisfactory sward. Phalaris, prairie grass, and paspalum have not made any progress, while only a few odd plants of lucerne are growing well.

These plots have been comparatively free from weed growth, but a small amount of flatweed, plantain, and sorrel is present.

The manurial responses have not been marked, nor does the sown area exhibit much vigour except for a short period in the spring. The soil fertility is evidently too low to maintain vigorous pasture growth.

Strezlecki (J. A. Long).

The plots at Strezlecki are located on a medium grey loam carrying a good growth of cocksfoot, rye, Yorkshire fog, and annual clovers. In these tests superphosphate and sulphate of ammonia have given a small response only. There has been no increase due to lime or potash. On the sown section cocksfoot and rye-grass have made good growth, and form the bulk of produce. Phalaris has done rather well, but paspalum and prairie grass have not made any progress. Red clover is firmly established and growing strongly. Subterranean clover made fair headway, but the white clover is weak.

Thistles, together with flatweed, plantain, sorrel, scarlet pimpernel, and selfheal have been troublesome on this plot.

On these plots as a whole top-dressing has not given a convincing response. Although the pasture section has had a good deal of competition from weeds, it is evident that this soil is capable of maintaining a healthy and vigorous stand of mixed pasture.

Thorpdale (C. Mills).

At Thorpdale the soil is a deep red loam carrying mainly cocksfoot, subterranean clover, annual grasses, and trefoils.

Superphosphate and sulphate of ammonia have given a fair response only, and there has been no increase due to lime or potash. The general growth on the sown species area has been good, with cocksfoot making the bulk of growth. Rye-grass has made fairly good progress. Red and subterranean clovers have made satisfactory headway, while white and alsike clovers have made poor growth only. Phalaris, prairie grass, paspalum, and lucerne have not made any growth this season. Capeweed, flatweed, plantain, sorrel, and thistles have appeared from time to time on the sown section, but have not been very aggressive.

The high soil fertility of this area partly accounts for the small manurial response. The pasture is inclined to become rank during the spring. The area is capable of carrying a vigorous growth of cocksfoot and subterranean clover, together with some rye-grass.

Traralgon (J. Stockdale).

The soil here is a light grey loam typical of a large area on which the pasture is capable of much improvement. The winter growth is fair, and the pastures mature late in spring. There has been a small response to superphosphate and sulphate of ammonia, and no increase due to lime or potash.

On the "sown species" plots the development of rye-grass, cocksfoot, and Phalaris has been satisfactory. Prairie grass and meadow foxtail have made a little progress, though the former is not very strong. Red and alsike clovers have grown well, but the development of white and subterranean clovers has been poor. Chewing's fescue and brown top have become well established, while a few lucerne plants are surviving, and, though small, appear to be healthy. Except for a little capeweed, flatweed, plantain, chickweed, and sorrel these plots have been comparatively free from weeds.

There has been a small response only to manurial treatment, partly due no doubt to the residual effect of previous top-dressings. The development of the species on the sown down area has been sufficient to indicate the improvement which can be brought about by the introduction of better species of grasses and clovers. Although the season did not favour the growth of subterranean clover, it has been shown that it will grow strongly under these soil conditions.

Welshpool (G. Christensen).

The soil at Welshpool is a light grey loam carrying a fair pasture of rye-grass, subterranean clover, crested dogstail, plantain, annual grasses and clovers. The winter growth is poor, being rather wet and cold, and the pastures mature late in the spring.

On the manurial plots there has been a good response to superphosphate and sulphate of ammonia. No visible increase has been recorded from potash, but lime showed a slight improvement in the spring. On the sown section rye-grass has made fair headway, but cocksfoot made very little growth. White, red alsike and subterranean clovers made fair progress. The Lotus species made satisfactory growth, while strawberry clover has made some little progress. Phalaris, prairie grass, and paspalum have failed to become established. Weeds, consisting mainly of flatweed, plantain, Yorkshire fog, chickenweed, and Poa annua, have been troublesome on these plots for some time.

The wet cold conditions and low soil fertility on this type of soil do not aid in the development and support of a vigorous pasture.

Yinnar (T. Quigley).

The soil here is a deep fertile grey loam, carrying a pasture mainly of rye-grass, white, and subterranean clovers. Winter growth in the district is fair, and the pastures mature late in the season.

There has been a good response to superphosphate, and a fair one to sulphate of ammonia, while lime and potash have not brought about any improvement. Rye-grass and white clover form the bulk of growth on the sown species section. Red and alsike clovers are making good headway, but cocksfoot is not very strong. Other species, such as Phalaris, prairie grass, paspalum, Lotus species, and strawberry clover are not making any progress. Although this area was grazed very hard during the winter, it has always made good vigorous recovery. Weeds, consisting mainly of loosestripe, sorrel, scarlet pimpernel, and chickweed, were troublesome during the winter only, while flatweed, plantain, and Yorkshire fog appeared in the late spring.

On these plots there has been a good response to superphosphate, and it is evident that the land is capable of maintaining a strong and vigorous pasture of rye, cocksfoot, and white clover.

WESTERN DISTRICT.

Birregurra (G. Whytcross).

The soil here is a heavy, dark, fertile clay, which sets hard and cracks deeply during the summer. The pasture normally consists of perennial rye-grass, Yorkshire fog, and strawberry clover, together with some subterranean clover. The ground becomes rather wet during the winter, and growth is poor. Recovery in the spring is slow, but the pastures grow well late into the season. In the manurial tests there has been a good response to superphosphate, while sulphate of ammonia effected an increase in the early spring months only. Lime brought about a slight improvement, but potash gave no response.

On the sown species section perennial rye-grass and white clover have made excellent establishment. Cocksfoot, red clover, and subterranean clover have made good progress, but the other species have not done well. Weed growth consists mainly of flatweed, plaintain, Yorkshire fog, soft brome, and silver grass.

The general plot growth during the season, though not vigorous, has been satisfactory. A small strip sown to locally-grown rye-grass has been outstanding throughout the trial. The growth on the manurial section, which is established on natural pasture, is weedy.

Buckley (J. H. Steele).

The soil at Buckley is a light, shallow, sandy silt, naturally growing a poor Danthonia, Eragrostis, and flatweed pasture. Cultivation and the sowing of subterranean clover, together with top-dressing with superphosphate, have resulted in a greatly improved pasture. The experiment area was established on a subterranean clover field, which was ploughed, worked, and sown in the hope of still further improving the pasture by the establishment of grasses as well as clovers. There is a large area of similar pasture land to be found south of the Prince's Highway between Moriac and Colac.

On the manurial plots there has been a very marked response to superphosphate, while sulphate of ammonia gave a marked increase during the early spring only. Neither lime nor potash gave any response. On the "sown species" section subterranean and red clovers have made fair headway only, while perennial rye-grass, cocksfoot, brown top, and Chewing's fescue have made good establishment. Phalaris

has not made satisfactory growth in competition with the perennial rye. Weeds such as sorrel and annual grasses are still persisting.

The composition of the manurial trial area has altered very rapidly with the closing of the field, and although the unmanurial plots are still subterranean clover dominant, the treated plots have become grass dominant. The sown grasses made splendid development during the first season, but during the second year their growth has become weaker, and sorrel is rather prominent. Cocksfoot has been encouraged by the late spring rains.

Casterton (J. McIntyre).

The soil here is a heavy grey clay situated on the river flat. The drainage is not good, and the land may become waterlogged during the winter period. In its untreated condition the natural pasture is poor, consisting of annual grasses and trefoils.

In the manurial tests a slight response was observed from the use of superphosphate, while sulphate of ammonia gave a little extra growth. Lime and potash have shown no improvement at all.

On the sown section rye-grass, cocksfoot, prairie grass, and Phalaris tuberosa have made good growth, but the establishment of the other grasses and the clovers has been poor. Weed growth consists mainly of barley grass and soft brome with docks and flatweed in small amount.

Owing to the intractable nature of the soil and its wet condition during the winter, pasture establishment on this area is rendered rather difficult. The liberal use of artificial manure has not been of much value in encouraging pasture establishment on this heavy country.

Coleraine (J. Brens).

The soil here is a deep sandy loam of medium fertility carrying a good annual pasture. The winter and early spring growth is good, but the pasture matures rather early.

The response to superphosphate has been very marked, and sulphate of ammonia has given a further increase in growth during the early spring months. Lime has been responsible for a slight improvement, but potash did not give any apparent increase.

On the "sown species" section the growth of perennial rye-grass, cocksfoot, Phalaris, prairie grass and subterranean clover has been good. Red clover, though not vigorous, is present on the plots. Good growth has been made by Chewing's fescue, brown top, and Kentucky blue grass. The other grasses and clovers have made poor growth only. Owing to the dense growth of the sown species the plots are fairly free from weeds. A little Yorkshire fog and capeweed are present on the manurial section.

The satisfactory establishment of grasses and subterranean clover and the excellent response from superphosphate are the outstanding features of this trial.

Dean's Marsh (Atkins Bros).

The plots at Dean's Marsh are situated on a grey buckshot loam of moderate fertility. The winter growth is fair, and the pastures mature in the late spring.

The growth on the manurial section consists mainly of rye-grass, Yorkshire fog, subterranean clover, together with suckling clover, soft brome, and silver grass. The response to superphosphate was marked. During the early spring sulphate of ammonia gave a fresher and greener growth. There was a slight improvement from the blood and bone fertilizer.

On the sown section good growth has been made by perennial rye-grass, cocksfoot, and subterranean clover. Red and white clovers, Chewing's fescue and brown top have persisted to some extent, but the other clovers and grasses have failed to establish. The weeds comprise mainly Yorkshire fog, plantain, soft brome, and flatweed.

On this trial the untreated plots stood out in contrast to the treated sections this season. The general growth, though not vigorous, has been quite satisfactory. Cocksfoot responded well to the late spring rains, but has since ceased growth.

Ecklin South (J. C. Mattinson).

These plots are on a light loam on rising ground, representative of a large portion of the country in the district. The winter growth normally is fair, and the pastures mature late in the spring.

In the manurial tests there has been a slight response to superphosphate and sulphate of ammonia, but the other manures did not give any increased growth or vigour.

On the area sown to the various species rye-grass, cocksfoot, and white clover are well established. Subterranean, red, and alsike

clovers are present in small amounts only, but the other grasses have failed to establish themselves. The weed growth consists mainly of Yorkshire fog, sweet vernal, crested dogstail, suckling clover, and flatweed.

On these plots the response to manures has not been marked, and the growth of the sown species has lacked vigour, annual weed grasses being common.

Garvoc (T. C. Blain).

The soil at Garvoc is a light grey loam representative of a fairly large area in the district which carries a rather poor pasture of Danthonia, weeping grass, and Yorkshire fog, together with a little rye-grass and trefoils.

On the manurial tests growth consists mainly of Yorkshire fog, sedges, Danthonia, subterranean clover, flatweed, and rye-grass. The response to superphosphate is marked, and a small increased growth for a short period in the early spring resulted from the use of sulphate of ammonia. The unmanured plots always have been backward. Neither lime nor potash gave any increased growth.

On the sown section perennial rye-grass, white and subterranean clovers have become well established, while cocksfoot, red and alsike clovers made satisfactory development. Brown top and Chewing's fescue made fair headway, but other species are present only in very small amount. Weeds consist mainly of sedges, weeping grass, Danthonia, fog, and flatweeds, but they are not very vigorous.

Despite the unfavorable soil and seasonal conditions, satisfactory swards have developed slowly on the sown section. The manurial tests have revealed an excellent response to superphosphate both in growth and sward improvement.

Hamilton (J. E. Chadderton).

The plots at Hamilton are situated on a light buckshot clay loam, typical of much of the Hamilton district. It is second class country, giving a poor winter growth and early spring maturity. There has been a fair response to superphosphate and to sulphate of ammonia, but no improvement was seen from the use of lime or potash.

Owing to the unsatisfactory establishment in 1932 and the accidental burning in February, 1933, the various pasture mixtures were resown in the autumn of 1933. The germination was fair only, due to the competition from weeds, but rye-grass, prairie grass, cocksfoot, and subterranean clover have made the most progress, while the other clovers made patchy growth. Weeds are very prominent, these consisting mainly of sorrel, flatweeds, silver grass, briza, and trifolium cernuum (nodding clover).

The growth on the "sown species" section has been fairly satisfactory since it was resown, while a vigorous growth of weeds and volunteer pasture plants has appeared on the manurial section.

Heywood (S. Quayle).

The soil here is a heavy clay loam, at the foot of the rising ground, and is liable to severe summer cracking. The ground normally is poorly grassed with Danthonia, Yorkshire fog, flatweed, sedges, and small trefoils. The winter growth is poor, and the pasture matures early in the spring.

In the manurial tests superphosphate has given a satisfactory increase in growth, and the response to nitrogen was marked. The response on the lime plots though good was not as outstanding as in the previous year. Blood and bone and potash have shown little or no improvement. The growth on these plots is mainly Yorkshire fog, flatweed, Danthonia, and Aira species.

On the area sown to the various species the growth of subterranean and white clovers is conspicuous, while the rye-grass is rather thin and weak. Of the other species cocksfoot, red and alsike clovers, brown top, and Chewing's fescue are making some headway. The weed growth comprises mainly sorrel, sedges, briza, Yorkshire fog, suckling clover, and flatweed.

The soil is rather low in fertility to support a good pasture. In the spring of 1933 lime was applied on a strip across the centre of the "sown down" section in the hope that a better development might be encouraged. On 24th April, 1933, an extension to the plot was made, an adjoining area being divided into plots and top-dressed with various forms and grades of lime after a basal dressing of superphosphate at the rate of 2 cwt. per acre. A good response was observed during the winter and early spring, and with the exception of calcium chloride and calcium chlorate all forms gave similar marked increases.

Macarthur (J. H. Neild).

The plots at Macarthur are located on flat, moderately heavy, black country, which normally carries a second class pasture consisting of Yorkshire fog, Danthonia, rye-grass,

flatweed, sedges, and annual trefoils. In these tests a good response to superphosphate was shown early in the season, and the response to nitrogen, though marked, was not sustained The responses to blood and bone, potash and lime have been very slight.

On the sown section the growth is mainly perennial rye-grass and subterranean clover, with cocksfoot making good headway. Brown top, Chewing's fescue, and white, red and alsike clovers also are present. Yorkshire fog, flatweed, and suckling clover are numerous but not vigorous.

In spite of the unfavorable start and seasonal conditions a satisfactory sward is now developing. Fertility appears to be the factor limiting the growth of this type of pasture.

Merino (Talliska Estate).

The plots here are situated on a dark heavy clay loam, which is capable of carrying a vigorous pasture of rye-grass, cocksfoot, and clovers. The winter growth is fair, while the growth in the spring is abundant.

On the manurial plots a fair response was shown to superphosphate, and nitrogen in the early spring, but this latter response was not sustained. No response has been observed from lime, potash, or blood and bone.

On the area sown to the various species good growth has been made by perennial rye-grass, cocksfoot, and subterranean clover. Phalaris and prairie grass also have established and made some headway, while red and alsike clovers were vigorous later in the season. Weeds such as Yorkshire fog, silver grass, sedges, flatweed, and thistles are present on this area.

This land is capable of carrying a good pasture of rye, cocksfoot, and clovers, and on account of the rich soil the response to the fertilizer is not very marked.

Mortlake (C. Fischmann).

The soil here is a light shallow buckshot loam overlying basalt, which carries native grasses and annual clovers. The winter growth is fair, the pastures maturing in the mid-spring.

In the manurial tests a good response has been obtained with superphosphate and nitrogen, although the effect of the latter has not been sustained. Potash and lime have given no visible increase.

On the "sown species" section rye-grass and cocksfoot have made good growth, while subterranean and white clovers are the best of the legumes. Phalaris and prairie grass have made good headway, and red and alsike clovers also are showing fair development. Yorkshire fog, flatweed, and suckling clover form the main weed growth, but they have not caused much trouble on the "sown down" area.

The growth and development on these plots have been satisfactory, although the fertility of this type of land is too low to maintain a first class pasture.

Noorat (I. Black).

The plots at Noorat are situated on a red volcanic soil which produces an abundant spring growth of annual grasses, trefoils, and weeds. Depending on the rains, the autumn growth may be vigorous, and the winter growth is usually good.

On the manurial plots no appreciable differences have been observed. A very slight response to superphosphate was noted early in the past spring. On the pasture mixture section perennial rye-grass, cocksfoot, and prairie grass have made very good development, while subterranean clover forms the main clover growth. Odd plants of Phalaris tuberosa have made strong headway. Weeds such as Yorkshire fog, barley grass, soft and sterile brome, and silver grass have made considerable growth.

The soil of this area is sufficiently rich to obviate the necessity for applying artificial manures, but its physical condition is unsuitable for maintaining a satisfactory permanent pasture. Pasture growth is dependent on frequent rains. Owing to the rapidity which which the surface soil dies out pasture establishment on this land is rendered difficult.

Penshurst (W. Underwood).

The soil here is a shallow basaltic clay loam, which naturally carries Danthonia and annual grasses, together with annual clovers and trefoils. The winter growth is slow, and the growth matures in the middle of spring.

On the manurial section, where the growth consists mainly of native grasses, trefoils and weeds, superphosphate has shown a very marked response. The increase from nitrogen was good, but it was not sustained, while lime and potash showed a slight improvement during the middle of the season.

On the "sown species" section perennial rye-grass and subterranean clover have made

the most vigorous growth, and cocksfoot has made satisfactory headway. The other grasses and clovers are weak. Weed growth consists mainly of Yorkshire fog grass, flatweed, sorrel, and soft brome.

On the area as a whole a good response has resulted from the use of superphosphate. Cocksfoot has been grazed more severely than the rye-grass.

Port Fairy (J. C. Goldie).

At Port Fairy the soil is a heavy sandy type interspersed with limestone rubble, and normally carries rye-grass and black medick. The winter and early spring growth of this pasture is good, but it matures rather early.

In the manurial tests there a small response only was obtained from the use of superphosphate, while nitrogen gave a slightly better growth during the early spring. Lime, potash, and blood and bone gave no appreciable increased growth.

On the area sown to the various species the growth and establishment of rye-grass have been good, while cocksfoot, prairie grass, and Phalaris are present in small amounts only. A strip of locally-grown rye-grass has shown stronger and better growth than the introduced seed. The clovers are weak, a little subterranean clover only being present. The weeds on these plots are mainly black medick, sterile brome, and Yorkshire fog grass.

The establishment of the sown grasses was retarded by the competition of the volunteer growth of weeds and grasses. The treatment with superphosphate has not given any marked response, due probably to the residual effect of previous top-dressings.

Stoneyford (A. McKenzie).

These tests are located on the Stoney Rises, which consist of rich, loose red soil, with many basaltic stones outcropping. This soil type carries annual grasses, trefoils, and weeds, which grow vigorously during the late autumn winter and spring, but mature early with the first hot weather.

A small increase was observed from superphosphate, and nitrogen promoted a little extra growth in the early spring, but the response was not sustained. No improvement was effected by the use of lime, potash, or blood and bone.

The pasture mixture section was resown in the autumn of 1933, according to the original plan, and again the sown species have failed to establish themselves in competition with the vigorous volunteer growth, and there are now a few tufts of cocksfoot, prairie grass, and a little Wimmera rye-grass present as a result of the seeding. Yorkshire fog, Bromus sterilis, silver grass, and volunteer rye-grass constitute the bulk of the weed growth.

This year the plot has made infinitely better growth than the outside adjoining paddock. The spelling of the pasture during the summer permitted the perennial rye to develop and produce strong vigorous plants. During the late autumn and winter the district pastures were almost entirely destroyed by an attack of the cockchafer grub, but the robust plants in the experimental plot were not affected, and the growth on this area stood out in marked contrast to the surrounding paddocks.

Timboon (J. Elson).

These plots are situated on a newly-cleared area in the Timboon sapling country. The soil is a rather poor, stiff loam with a heavy clay subsoil, and is subject to water-logging in the winter.

On the manurial plots a good response to superphosphate and sulphate of ammonia has been recorded. The unmanured strips are very poor and backward, the establishment of grass and clover on them being very weak. A fair improvement from the use of lime and potash, in conjunction with superphosphate and sulphate of ammonia, has been noted.

On the "sown species" section the growth of white clover is outstanding, while subterranean red and alsike clovers have made good headway. Rye-grass is present also. Lotus major and brown top have made very good growth, but prairie grass, cocksfoot, and Phalaris are weak. The weed growth consists mainly of sorrel, flatweed, sedges, and Yorkshire fog, together with native scrub, which is reappearing.

Superphosphate and lime have had a very beneficial effect, and appear to be necessary for satisfactory pasture establishment. The white clover and Lotus major have made vigorous growth, but the rye-grass is making slow headway only. On this particular area the growth of cocksfoot has been disappointing.

NOTE.—*The purpose of the manurial section of the pilot plots described above is to indicate the most satisfactory fertilizer treatment on the various soil and pasture types. As comparisons are made by observation only, it is possible that certain treatments recorded as having given no response may have had some small effect on the pasture.*

Potato Growing in Victoria

No. 9.—Harvesting and Grading

By J. T. Ramsay, Potato Expert.

Previous articles of this series, which appeared in the March, April, May, July, and December, 1933, and January, February and March, 1934, issues of the Journal, dealt with the condition and selection of seed, seed storage methods, change of seed, plant food requirements, the use of artificial fertilizers, preparations for planting, planting and inter-cultivation.

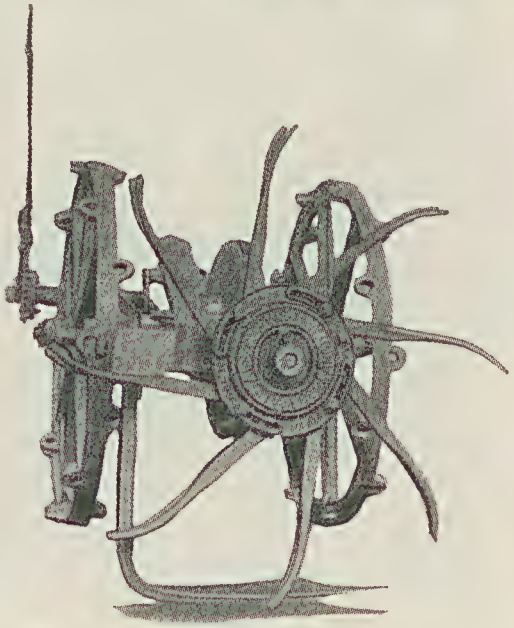
THE harvesting of the Victorian potato crop extends over a considerable portion of the year. In the Western District (Koroit-Warrnambool) and on the Mornington Peninsula (Brighton-Cheltenham) digging commences towards the end of October. Owing to their proximity to the sea these districts are favoured with such a mild climate that planting may be done shortly after midwinter without much danger from damage by frost. Digging continues right through the season, from October till July, and even later in some seasons, so that harvesting takes place over at least nine months of the year. In occasional seasons, during which such low prices prevailed that growers did not feel disposed to incur the cost of harvesting, but at the tail end of which a sharp market recovery took place, digging actually has been done up to the end of September.

In certain soils, particularly well-drained volcanic loams in the cooler districts (Ballarat and the Gippsland hills), potatoes left in the ground until late in the reason keep in excellent condition, in fact, just as well as if harvested and pitted. While this procedure may be quite satisfactory, so far as keeping the potatoes in sound condition is concerned, it has the big disadvantage that it prevents cultivation being given to the paddock, and tends to make the land very dirty, thus adding to the difficulties and cost of digging. Another drawback to deferring harvesting much beyond the date of ripening of the crop, is that the land is lying idle instead of being sown with a following crop as soon as it otherwise might be.

Harvesting is done both by hand and machine. Where the soil conditions are suitable the latter is the more efficient and economical method. Working under right conditions the machines will dig faster, cleaner, and with less damage to the tubers than hand diggers, while, in addition, the machines are ideal cultivators, and leave the soil in a perfect condition of tilth.

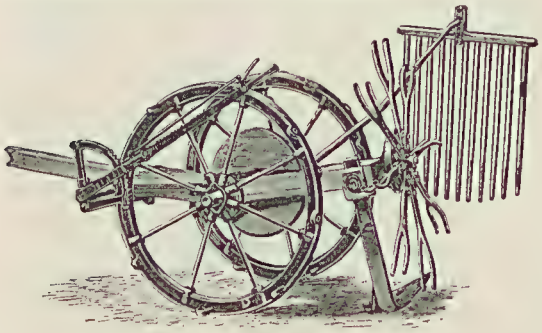
There are two distinct types of diggers on the market—the rotary and the elevator type, while a third and new type, an Australian invention, will be available shortly.

The rotary type operates with a loosening share set to a depth just lower than the deepest potatoes. As the soil and tubers are



A rotary potato-digger.

forced over this share by pressure of the soil in front of the machine, they are met by a series of spinning or rotary forks which, revolving at fairly high speed, pulverize the soil, separating it from the tubers and leaving the latter spread on the surface of the ground on the right hand side of the machine ready for picking up. This rotary type of digger is suitable for hilly or flat country, and is quite within the power of two ordinary draught horses. In working this digger it is necessary that each row be picked up before the next is dug, otherwise some of the potatoes in the row previously dug will be covered. This means that a squad of from ten to twenty pickers (according to the crop) will be needed to keep the machine going steadily. Under normal conditions, 3 to 4 acres per day can be dug by this machine.



Another type of rotary-digger.

With the exception of the loosening share, the elevator type of digger works on an entirely different principle. After the soil and tubers have been forced over the share they land on to an endless travelling chain which carries them to the rear of the machine. In travelling along this chain belt the soil is agitated and pulverized, and drops through between the links of the chain, so that practically only the potatoes and haulms are delivered behind the machine in the same row as that in which they were grown. This type of machine is heavier in draught than the rotary, but does excellent work under reasonable conditions. One disadvantage of the elevator digger is that it will not dig satisfactorily on a steep down grade. On flat or gently undulating country it is effective. The new type of digger now being placed on the market has immediately behind the share a comb which is spinning in the opposite direction to that in which the machine is travelling, and which separates the soil from

Pronged plough digger.

the tubers effectively, and leaves them on the surface along the row in which they grew. This machine has the advantage of lightness in draught, together with efficiency in digging.

All of these types of digger may be operated (provided the soil conditions are reasonably fair, i.e., not too wet and not too hard) in crops ripe or unripe. In setting a mechanical digger care must be taken that the loosening share is set at the correct depth. If set too high considerable damage will be done by cutting the potatoes—if set too low the draught will be appreciably increased, and there will be a tendency to cover the tubers instead of leaving them exposed on the surface of the ground. Plough digging is sometimes resorted to, and a special double-breasted prong attached to a plough frame (as illustrated) is used for this purpose. This implement is suitable for light sandy soils, but not for heavy types of land unless these are in exceptionally loose condition. Notwithstanding the efficiency of digging machines, the bulk of the Victorian crop is harvested by manual labour.

Irrespective of the method employed for lifting the crop, the heavy harrows should always be used after digging and bagging. This exposes practically all tubers which have been inadvertently covered, and reduces trouble from self-sown plants in the succeeding crop. In extreme cases where the ground is very hard or very wet at digging time, it may be necessary to use the spring-tooth cultivator to discover the tubers which have been missed. From time to time attempts have been made to arrange for an automatic "picker-up" and bagger to be attached to mechanical diggers. These have not been a success, chiefly on account of the machines not being capable of discriminating between potatoes and stones or lumps of soil. Notwithstanding the fact that

it has not been possible to devise a satisfactorily combined digger, picker and bagger, the digger itself is a machine of considerable economic importance to the large scale potato-growers, being both efficient and speedy.

The earliest harvesting (about the end of October) is generally commenced before the crops have ripened, and because potatoes at this stage are very soft in the skin and liable to injury, they have to be marketed in cases. This reduces to a minimum the bruising of the skin and consequent discoloration of the surface of the tubers which quickly takes place when the tender skins are roughed up.

The later crops in Victoria generally are allowed to mature fully before being dug. Fully ripe tubers are marketed in bags for the sake of economy. These bags run about fourteen to the ton, though some growers in order to save bags fill them almost to overflowing, so that when sown the top layer is only kept in the bag by the sewing twine, and is entirely unprotected from the weather. Unless the potatoes are quickly disposed of, this is false economy, as the top layer is subject to damage by greening (the action of light) or frost. A parcel of potatoes with the bags neatly and closely sown is much more attractive than one with the mouths of the bags gaping wide open, and generally the extra value received will compensate for the few extra bags required for a truck load.

Grading.

The grading of the crop is an important operation which is frequently neglected. Several methods of grading are in use, the most common being by hand, though grading riddles and mechanical graders, which involve considerably less labour, are coming gradually into vogue. When this work is done entirely by hand it is a most tedious process, necessitating the handling of each individual tuber.

An economical method is the use of hand-operated grading riddles. A set of these consists of one large diameter riddle (32 inches diameter) with a mesh of ¾ inch. This permits only soil to pass through. This riddle is supported on a barrel (preferably one with the bottom knocked out of it) or other convenient rest, such as the seed-potato boxes shown. Above the large-diameter riddle, one of smaller diameter (26 inches) is operated. The mesh of this is anything from 1¼ inches to 2 inches, according to the grade required. If three grades are required, then three riddles are operated at one time by which means market size, seed, and chats may be separated

Digging the potato crop. ("Australasian" photo.)

with expedition at one operation. This illustration shows the grading of a parcel containing only market and seed sizes. The market size tubers are caught on the top riddle, and delivered from there into the bag direct. The smaller mesh riddle underneath catches the seed, and when this contains enough it is lightly shaken to shake the dirt through, and the seed is then delivered straight into the seed potato boxes, which are placed in a convenient position. Shovelling from the heap is done with a special wire shovel, which can be operated on the uneven bottom of a pit or on a wooden floor, with little risk of damage to the potatoes. When the tubers are spread on the riddle from the shovel, the operator is able to see at a glance and remove any that are diseased or otherwise defective. A light shake of the riddle causes everything under the size of the mesh to pass on to the under sieve, the balance remaining on top being immediatly ready for bagging or boxing.

Elevator type potato-digger.

It is advisable to have a range of these riddles from 1¼-inch mesh rising by ¼-inch gradations to, say, 2 inches, in order that the grower may have the choice of sizes to suit the grades intended to be made. No definite size of mesh to be used can be given, as the different varieties, on account of their varying shapes, require different-sized meshes.

One feature of these riddles is that they are inexpensive, and with ordinary care will give many years of service. The potato screen illustrated may be used to replace the large diameter, small-mesh riddle.

Where grading is done at harvesting, considerable annoyance and trouble often are experienced, particularly where a number of pickers are employed, as consignments may be rejected at the loading station through careless grading on the part of only one of the pickers. Should the inspector happen on a bag or two of this low-grade stuff, the whole consignment may be condemned, and has to be graded over again before securing a certificate.

Grading with hand riddles.

Sorting over the whole truck load often may be obviated by allotting to each picker a distinguishing mark or number, and having his particular bags branded with such mark or number. When trouble arises at inspection it can be ascertained whether one or all of the pickers are at fault. If only one is at fault the expense of sorting over the lot is eliminated and confined to only those bags bearing the brand of the faulty grader.

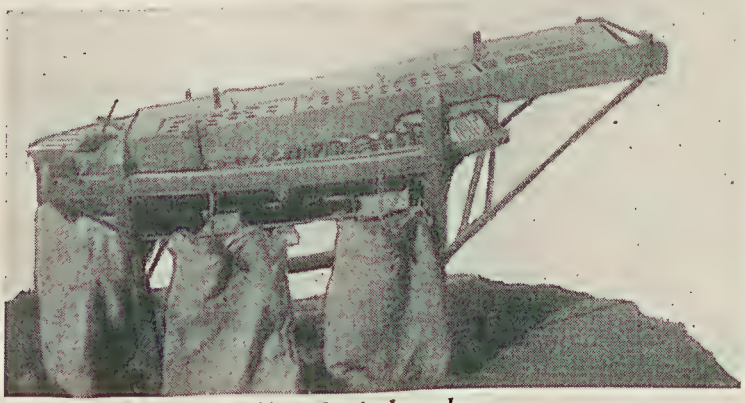
The mechanical grader illustrated may be operated either by hand or small engine. This machine is of particular value in ex-

pediting the grading where there is not much disease affecting the crop. It is adjustable to practically any grades, and will sort three sizes at one operation. The chats are delivered into bags on the side towards the

Screen grader.

rear of the grader, the middle sizes at the side towards the front, and the prime tubers over the front. This grader is of comparatively light weight, and may be moved for short distances by hand.

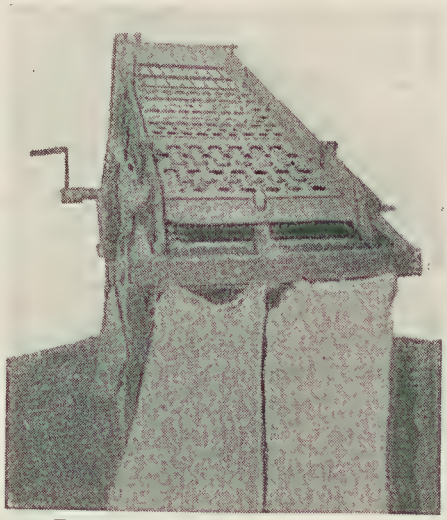
The grading of potatoes for market is an operation which should be conscientiously carried out. The neglect to grade well, or the attempt to palm off inferior stuff, is certain to prove unprofitable, for the simple reason that merchants, once bitten, will steer clear of such growers in future purchases. Growers should aim at sending their potatoes to market in such condition that they would be prepared, and pleased, publicly to claim ownership.



A mechanical grader.

Field Crop Competitions.

In order to foster the potato-growing industry in their respective districts, several agricultural societies in this State have for some years offered prizes for competition amongst their growers for the best crops of the season. These examples might be followed with profitable results by the societies of other districts. Such competitions cannot but have an all-round beneficial influence. The friendly rivalry created by them must of



End view of mechanical grader.

necessity promote effort to increase knowledge of how soils can best be husbanded to increase their productiveness, and how crops can best be treated so that their prolificacy may be augmented. The acquirement of that knowledge, coupled with the desire to eclipse the results obtained by other growers, must develop interest which will find expression in its practical application to the cultivation of crops, with the necessary result that higher all-round yields will obtain.

It may be argued that the growing of a few acres for a competition would not affect the standard of cultivation of the larger areas generally grown commercially. A moment's consideration should be sufficient to prove the

[*Continued on page 210.*

Milk Production

Importance of Cleanliness

By J. M. Kerr, Chief Dairy Supervisor

MILK production and distribution are beset with many difficulties, not the least being the problem of keeping the milk fresh and wholesome, until it is delivered to the consumer. The statute which compels metropolitan dairymen to reduce all milk received from the country to the protective low temperature of 50 degrees lessens the danger of spoiling from the time they receive it onwards, but it is between the farm and the metropolis that milk often deteriorates. If this impairment is one of chemical change amounting to physical decay or decomposition, it will almost always be found to be the result of bacterial or germ action. Germs are the direct cause of most of those changes in milk which cause it to spoil. Immediately they obtain entry they feed on the lactose (one of the main milk solids), and in doing so they add oxygen to certain parts of it to form lactic acid. When this acid content amounts to about .4 per cent., it can be tasted. As the germs breed, their acid-product increases. When it has increased to about .7 per cent. of the total milk, curdling occurs (as it always does when any acid, even though no stronger than fruit juice, makes contact with it), and before long all the milk becomes thick. These germs are extremely minute (it would take millions to bulk as large as the head of a pin), but once they enter milk they have everything they require in the way of breeding facilities, and can multiply very rapidly.

Methods of Control.

Methods for their control are various, but all are based essentially on the necessity for absolute cleanliness in handling milk in all stages, from the cow yard to the consumer. Dirt is the germ's best conveyor. It is certainly not easy to keep germs out of milk if the cow's udders and teats are carrying mud, as they so frequently do in winter, or a coat of green manure, as they are apt to do in the spring; or when the same mixture, having become dust, is being carried right into the cowshed atmosphere by intensely drying winds in summer. Dirty hands of the milker and untrimmed hair around the teats of the cows also assist in introducing dirt, and consequently germs into the milk.

Another common cause of the spread of milk-spoiling germs is the failure to thoroughly wash utensils with water sufficiently hot to kill every germ on them, and to ensure rapid and complete drying, as a moist surface often enables a germ to persist, and perhaps incubate thereon. The milky-natured moisture of an ill-cleansed dairy utensil makes possible a reproduction-rate almost as speedy as if in the milk itself. Especially is this so where the washing management is so faulty as to allow drainings to collect and lie within the vessel, as is sometimes seen even in supposedly-cleansed vats and cans. It should be remembered that no metal surface used in contact with milk or cream is properly washed that remains damp for some time after washing. Anything short of a bone-dry condition condemns the owner as a dairyman. The dryness should be achieved solely by the agency of heat (assuming, of course, that the utensil is always placed in the position most favorable to draining and evaporation). Heat is what the dairyman must rely on to destroy the germs that would otherwise harbour and multiply in the dairy utensils, but it is well to remember that up to a point heat helps germs. Like all other living things, they are favoured by a certain moderate degree of warmth, and usually that temperature is about human blood heat (98 to 100 degrees).

In this fact lies the explanation why milk tends to spoil more quickly in summer than in winter. In cool weather germs multiply slowly, and milk, once cooled, keeps cool, and germs cannot multiply in a cold medium.

Hot weather, being nearer to their most favoured temperature, makes them much more active, and this has led some people to think that hot weather, and particularly thundery weather, causes milk to spoil. Actually, the same mugginess and warmth of atmosphere that cause thunder cause also a quicker growth of germs, with consequent spoiling.

Having taken all practicable steps by the utmost cleanliness to keep the initial germ-content of the milk down to small numbers, and as milk comes from the cow at blood heat, a very favorable temperature for the propagation of germ life, the dairyman's second line of defence is to deprive that content of the helpful milk-heat as far and as early as possible. The cooler the milk is kept the better.

Once-a-day Delivery.

High bacteria-counts are more frequent in the hot season than in winter, as might be expected, but there is another period of the year when excessive counts are apt to occur on a summer scale, without any rise whatever in weather-temperature to account for it. Rather, this seasonal rise occurs so regularly each year, about late April and early May, that it would appear to be dependent on a certain *fall* in weather-temperature. Peculiar as this may seem, it is so. But in this instance it is not the lower weather-temperature of itself that has increased the bacteria counts, but that the cooler weather has led many dairy-farmers to revert to the once-a-day delivery, with its lengthened period between producer and consumer, and the consequently more favorable conditions to germ multiplication.

Owing to its meaning a considerable saving in farm labour, many farmers are apt to return to the once-a-day delivery before weather conditions are actually favorable to it, but it cannot be regarded as the best practice even in the cold season, and there is certainly an undue risk in dropping the second daily delivery before the cold season has definitely set in. Indeed, it is questionable whether it should be tolerated on any but a farm equipped with brine-cooling apparatus, unless it can be arranged that the delivery is in the evening, and after the evening's milking. Where milk is delivered in the morning only, the milk does not reach the consumer till sometimes 36 hours after the milking.

With evening or night delivery, none of the milk need be more than 24 hours old when delivered to the consumer. This is, of course, not older than much of it would be if the delivery were twice daily. The same trouble with high counts is likely to occur about September, when the colder half of the year is merging into the warmer. Twice-a-day delivery from the farm then becomes imperative, and any unduly protracted continuance of the single-delivery practice into the warmer season is apt to result in excessive bacteria counts.

In milking sheds where the receiving yard is on the northern or north-western side, a difficult time to keep germs out of the milk pails is the summer, when hot drying north winds prevail. The manure on the yard surface having dried into dust is lifted by these winds, and whirls into the bail atmosphere, making a heavy initial infestation of germs from this source certain. Under such circumstances, much depends on the regular sweeping of the yards, for, of course, manure should not be allowed to accumulate anywhere near a cow-shed, much less where the prevailing winds are certain to blow it towards the cow-bails. In this regard the receiving yard should, if possible, not be placed on any other side of the milking-shed but the eastern, but even more important than the direction of prevailing winds is the direction of the yard drainage. Cows should not enter the milking shed from the highest side, but preferably from the lowest, and if this is not on the east the favorable eastern position for the receiving yard must be foregone in the interests of better drainage.

Ropy Milk.

Another form of germ infection associated with season is that causing "ropy milk," which almost invariably confines itself to the late summer and early autumn. This is so for two reasons. Firstly, the causative germ flourishes only in more or less stagnant or stale water; and, secondly, cows are tempted to graze about stagnant water in the dry season. This often is accentuated when a heavy summer rain lodging in swampy hollows warms up before it diminishes by evaporation.

When the organism which causes ropy milk gets on to a cow's teats and udder, it is but a step further into the milk bucket. The effect of this organism is to make the milk stringy or ropy, causing it to adhere to anything dipped into it, and be drawn out into long threads when the article is lifted from the

milk. Ropiness in milk is almost invariably a summer or autumn trouble, and the cause may usually be attributed to water.

A condition which must not be confused with ropy milk is the somewhat similar stickiness due to mastitis, a disease of the udder. This, of course, is not seasonal at all, but is likely to occur wherever mastitis occurs.

There is still another condition not unlike ropy milk and sometimes mistaken for it; this is a stickiness or sliminess in the milk due to the including of milk from cows too nearly dry, especially (as is often the case), if such cows are milked only once a day. As more cows dry off in the autumn than other seasons of the year, this trouble mostly occurs then, and may consequently be classed as a seasonal one, more or less.

Once-a-day milk from semi-dry cows is, no doubt, an occasional factor in causing those autumnal rises in bacteria-count which have already been ascribed to delay in delivery, and it is not fit for a city milk supply. The position must, of course, be aggravated when the factor of once-a-day milking is added to that of once-a-day delivery.

When milking cows wade into lagoons or billabongs (as they readily will do when green feed elsewhere is scarce), the stale water coming in contact with the teats is apt to impart a characteristic and objectionable taint to the milk. Here, also, dry weather is at least a contributory cause, for not only do cows avoid such grazing in the wetter seasons, but the more abundant and fresher water would not be tainted. This taint always becomes more troublesome in seasons dry enough both to check green growth elsewhere and to make the lagoons low and stale. The eating of the sedge growth also has a tainting effect.

Another seasonal impairment of milk is not bacterial but constitutional, caused by a deficiency of non-fatty solids sometimes resulting from a prolonged spell of drought. The deficiency is mostly in the casein of the milk, and is possibly related to the inability of pasture plants to absorb their normal minerals, phosphates especially, without a sufficiency of water—their natural solvent. It usually disappears with the advent of fresh young pasture. Though natural deficiency of non-fatty solids is relatively rare, it occurs most commonly in the autumn, and is still another factor in the many which stamp autumn as the season of greatest potential trouble to the dairy-farmer desirous of supplying a wholesome and bona fide milk to Melbourne.

Potato Growing in Victoria.

(*Continued from page 207*)

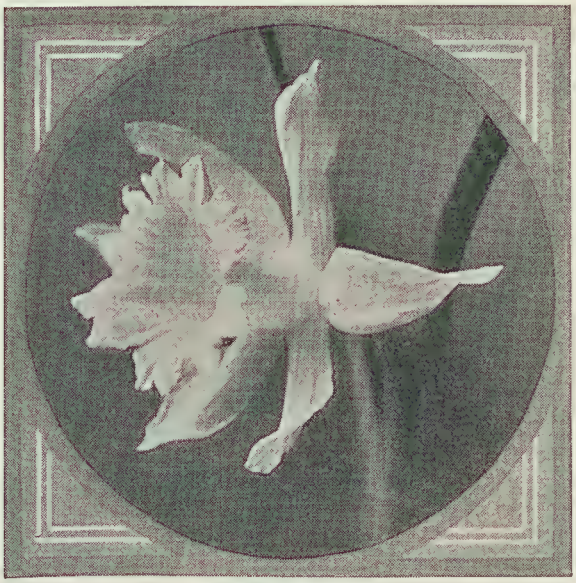
fallacy of such argument. The educational benefit derived from the practical demonstration of the increased yield from the small area on which more intense cultural methods were practised would make it obvious that these methods produce returns showing a greater proportionate profit, and would have the effect of causing these improved methods to be applied to the larger areas.

During the past few years, observation of many of the crops entered in field crop competitions have shown that considerable improvement in the quality and tonnage of the crops could be accomplished by closer planting of the seed. Many of the crops yielded weights of from 12 to 18 tons per acre. In one exceptional case a yield of over 25 tons of marketable tubers was recorded. This is believed to constitute a record for Victoria, if not for Australia. The credit of growing such heavy tonnage was in many cases marred by the fact that the tubers produced were coarse in size and quality. This could be remedied if growers adopted the practice of closer planting of the seed than is the rule.

Land which is capable of growing 15 to 18 tons of potatoes to the acre is rich enough to carry a full crop with planting distanced 2 ft. 3 in. between the rows, and the sets spaced 14 inches or 15 inches in the rows. Planting at those distances, or even less on the richer lands, would have the effect of producing heavier yields of medium sized and better quality tubers. The grower who produces tubers as large as mangolds has his system of planting to blame. He should plant closer, and so restrict the feeding area of the plants. The result would be improvement in size, improvement in quality, and equally heavy, if not a heavier, tonnage per acre.

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.



Trumpet Daffodil.

The Flower Garden.

THE planting of bulbs is the main work of the garden this month; and as bulbs are very hardy, both in town and country, and rely almost wholly on the natural rainfall, the planting should be very extensive.

Bulbs are usually sown far too shallow. Daffodils, Hyacinths, Ranunculus, and Anemone should be placed with the tip of the bulb from 5 to 6 inches below the surface. Tulips must be set an inch deeper.

All manure, animal manure for preference, should be placed below the bulbs. The bulbs themselves should be bedded in sand; first a little placed on the bottom of the hole, and the bulbs set therein; finally, they should be covered with sand, and the hole filled with soil. This provides for health and drainage for the bulbs.

All seedlings from seed sown in the previous months should be planted out in the garden. A cool evening is the best time for the work. For Iceland poppies, the soil should be enriched with some animal manure. This provides for vigorous plants, and specially fine blooms.

Lime should be freely used in every part of the flower garden during the coming month; of course, care must be taken that it does not reach such flowers as Lilium, Heath, Daphne, Azalea, Rhododendron, Lily of the Valley, Ranunculus, and Anemone.

The Orchard.

The "drop" of apples has been very extensive all over the State, and has caused a big loss to growers. It is important that all moth-infested fruit be gathered as soon as possible, and destroyed. The chemical bandages should be allowed to remain; there is no need to disturb these until well into winter.

Some growers are expressing concern at finding live larvae in these bandages. It should be noted that the action of the beta-naphthol is somewhat slow, and that the larvae are not killed for some time after they find refuge in the bandages. There is no record of larvae leaving the bandages after crawling therein; but instances are known of the larvae having remained unkilled for several weeks.

All deciduous trees in scale areas should be closely searched for either San Josè or Mussel scale. These trees, if affected, should be marked, and a vigorous spray programme carried out in the winter. Apples and pears cannot be exported if any sign of San Josè scale is noted on the fruit, so that growers should take every necessary precaution to check infestations.

The Vegetable Garden.

This is the time for setting out plants of the cabbage family. Sturdy plants, neither overgrown nor leggy, should be selected, and there is no objection to small or young plants.

The soil should be deeply and well worked, and only old animal manure used.

Beds should be manured and dug over for sowing seeds of carrot, parsnip, turnip, and beet. The soil should be deeply dug over and very well pulverized. After levelling, the seed should be thinly sown in rows 6 inches apart. The seed should be lightly covered with a rubbing of old manure, old chaff, dead leaves, or some similar material, to give protection, and to prevent too much evaporation of soil moisture.

F.A.Q. Wheat

Analysis of 1934 Sample

By W. R. Jewell, M.Sc., Agricultural Research Chemist.

The bushel weight (60 lb.) of this year's f.a.q. wheat sample is somewhat lower than usual, but much superior to that of the 1931 sample, another year in which heavy rains interfered with the harvest. The lowered bushel weight, due to wet conditions late in December, is also accompanied by a certain amount of bleached grain, which detracts somewhat from the appearance of the sample, but which otherwise has no ill effect. In accordance with the practice for some years past, a portion of this f.a.q. sample was critically examined and subjected to analysis, and to a milling test in the experimental flour mill.

The percentage of screenings is only about one-half of that in last year's sample, and approaches the average for a number of years past. Some broken grain is in evidence, together with the usual collection of foreign seeds (oats, barley, wild mustard, thistle, rape, &c.). The moisture content is normal, and the protein content shows a very slight improvement on last year. Analytical results, compared with past years, are:—

—	1929.	1930.	1931.	1932.	1933.	1934.
Moisture .. %	9·20	10·58	11·43	9·31	10·59	10·89
Impurities (screenings) %	3·4	2·7	3·5	6·7	8·7	4·8
Ash .. .. %	1·26	1·33	1·47	1·41	1·39	1·36
Protein (Nx5·7) %	10·11	10·87	10·97	9·66	9·35	9·53
Bushel Weight (lb.)	61¾	62	58½	62¾	62	60

Flour.

No difficulty was experienced in milling the sample, and the flour yield was quite normal. As would be expected from the protein figure, the gluten contents show a slight improvement over last year's figures, and a better gluten quality is indicated. The test loaf, obtained by the standard baking test, is of average volume, and somewhat better than last year's.

Generally speaking, it is apparent that the quality of this season's f.a.q. wheat, and the flour therefrom, is superior to that in evidence last season, and is accompanied by an improved diastatic capacity. Comparative figures are given below:—

—	1929.	1930.	1931.	1932.	1933.	1934.
Flour—						
Yield .. %	70·4	73·2	73·4	72·8	73·2	72·8
Ash .. %	0·41	0·49	0·54	0·56	0·49	0·51
Protein (N x 5·7) %	9·20	9·54	9·58	8·65	8·02	8·79
Wet Gluten %	25·8	26·4	29·4	26·1	22·4	23·1
Dry Gluten.. %	8·5	8·6	9·7	8·7	7·6	7·9
Water absorption (qts.)	45·2	41·0	40·5	40·5	40·5	40·5
Standard Loaf Volume (c.c.)	1,525	1,610	1,760	1,585	1,620	1,645

Bran and Pollard.

Normal yields of bran and pollard were obtained, and analytical data are recorded in the following table:—

—	1929.	1930.	1931.	1932.	1933.	1934.
Bran—						
Ash .. %	4·67	3·55	4·27	3·76	3·73	3·67
Protein (N x 6·25) %	13·52	15·31	15·57	15·37	12·44	14·50
Pollard—						
Ash .. %	2·52	2·47	3·17	2·85	2·23	2·49
Protein .. %	14·83	15·09	15·42	14·74	14·08	15·02

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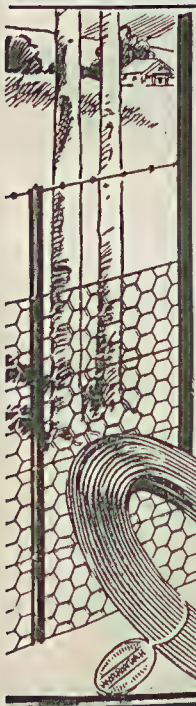

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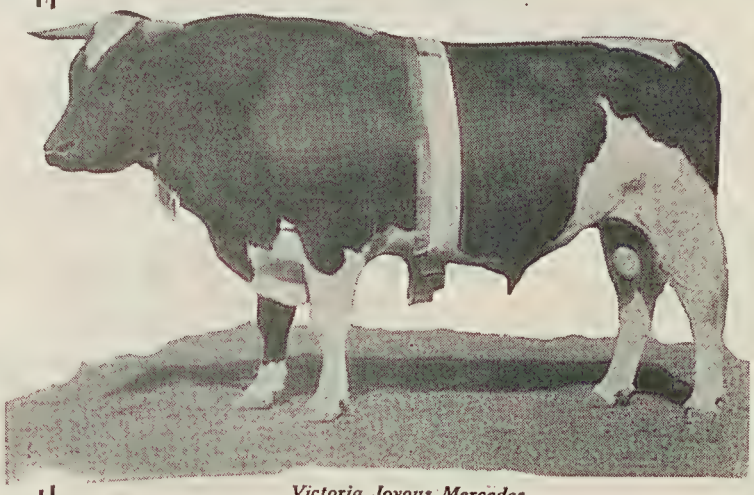

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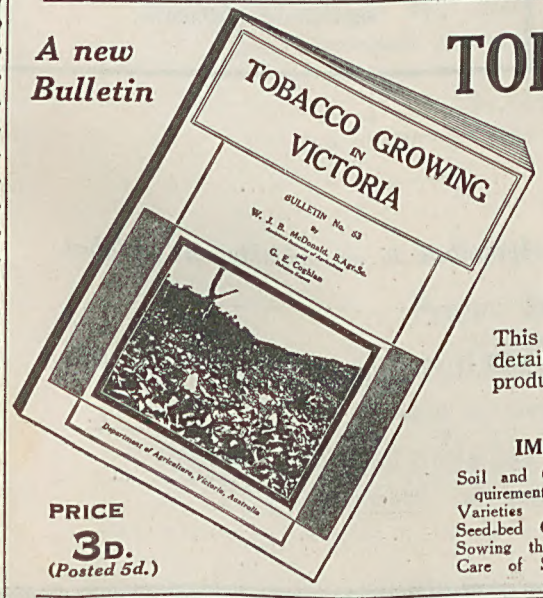

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